MAXIMUM POWER COMPUTING

atomic

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COMPUTEX REPORT

ATI physics unleashed

PLUS: Retro RAM • Conroe • AMD Live!

Death to GTA

Atari's Just Cause hits Rockstar where it hurts

QUAD DAMAGE

We push Quad SLI to breaking point!

WHO NEEDS HI-DEF TV?

SIX of the latest projectors reviewed!

WHY SPACE SIMS SUCK!

Elite's David Braben speaks out on the genre he created

ECS

pure quiet

pure perfection

Antec's all new P180

pure performance

WITHOUT **COMPROMISE**

Antec
The **P**ower of **Y**ou

Being *Atomic*

It's been two years sitting in the Captain's chair at *Atomic*. Though its intricacies are as mysterious as the Tardis (I still don't know what all the buttons do), it's a comfortable helm and it's even got a fridge built-in.

And that well groomed view you see of me above isn't quite accurate, I'm a tad scruffier than that. But then we all start out *looking* normal.

For example, since working here Bill has come to like dressing others up as pirates; Logan's hair has formed a government; and Craig, well, Craig likes wearing underpants on his head. Ok not really. But give him time.

The point, I think, is that *Atomic* changes you. It does this because it's not just a magazine – it's more of a lifestyle, and a reflection of the geek community for which we are all a part. It's why we can do things like *Atomic* Live! and know that you'll enjoy them as much as we do.

As my last issue in command, what can I say? It's been fantastic. The *Atomic* team is the best in the industry. Everyone here breathes tech and games. Even though it's been months in release, I still mod Oblivion more than I play it, and I think that embodies the essence of *Atomic*. It's not so much the end goal of using our toys that brings the most joy; it's the journey of building, optimising and applying our knowledge to create something we're proud of. Just as I hope I've done with *Atomic*.

So thank you for all your support and passionate dedication unmatched by any another magazine readership on Earth. This chair, its entourage of spandex-clad counsellors, and myriad of awe-inspiring buttons will go to Logan next month, for he is *tech incarnate*. At least that's how he dresses. For now, enjoy the issue!
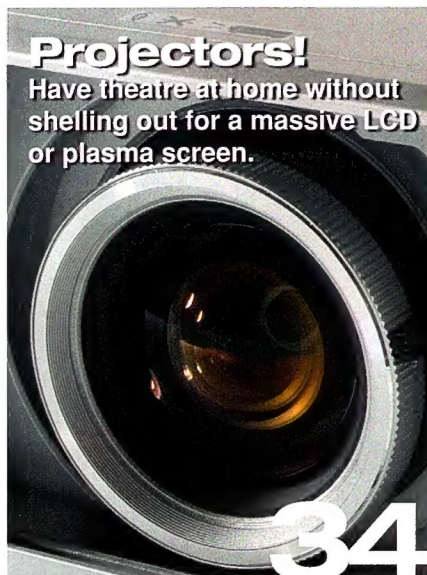
I'll see you around.

Ashton Mills

amills@atomicmpc.com.au

UPDATE
TECH NEWS YOU CAN'T LIVE WITHOUT. SERIOUSLY, IT'S THAT AWESOME

Opera 9 is alive!
Logan Booker finds out why ACID is good.

The latest version of Opera has been in beta for some time and we've been eagerly awaiting its release. Well, we don't have to wait any longer – Opera 9 is out and can be downloaded from Opera's website: **www.opera.com**. So upgrade from 8 before the cobwebs start setting in.

Opera 9 is no incremental update, even though it contains various garden-variety fixes for page rendering and stability. Added to the mix in the new release is content blocking; support for version 1.0 of the RSS-like Atom aggregator; fixes for Cascading Style Sheets (CSS) 2.1 and support for CSS 3; CMYK support for JPEG images; user-agent masking; a new 'widget' system that allows users to create desktop applications that can hook into online services and, best of all, integrated BitTorrent support. Opera 9 also passes the gruelling ACID 2 browser rendering test with flying colours… and fonts, tables and hyperlinks.

Opera Widgets is an interesting addition to the Opera browser, in the fact that the applications don't reside within Opera itself, instead living on your desktop like any old program. Examples of some widgets include a BBC RSS reader, a clock shaped like a heart and even a Tetris game (check **widgets.opera.com** for more). If anything, Opera Widgets seems like a competitor to Firefox's extensions capability, except better.

We're also digging the BitTorrent support – although hooking your favourite BT client into any browser wasn't exactly a troublesome affair anyway – and passing ACID 2 is worthy of a pat on the back. If you're looking for a change in Web browser and Firefox doesn't float your <DIV>, then check out Opera 9.

This is not my Office!
Logan Booker sticks his hands into Microsoft's patent woes.

Microsoft has again struck out in the legal arena, losing an appeal against last year's ruling that forced it to remove functionality from its database application Access in Office XP and Office 2003, and awarded the creator of the technology, Carlos Amado, US$8.9 million for the trouble. The loss will most definitely see Microsoft coughing up even more dough for dragging Amado back into court.

According to legal documents, Amado's technology covering US patents 5,537,590 and 5,701,400 was used in Microsoft's Office XP and 2003 suites since the late 90s – without Amado's permission. Amado reportedly pitched the technology to Microsoft in 1992 and was told to get lost.

Patents 5,537,590 and 5,701,400 cover respectively an 'Apparatus for applying analysis rules to data sets in a relational database to generate a database of diagnostic records linked to the data sets' and, setting a world record for bloody long patent titles, a 'Method and apparatus for applying if-then-else rules to data sets in a relational data base and generating from the results of application of said rules a database of diagnostics linked to said data sets to aid executive analysis of financial data'. Basically the patents outline how to create and update tables in an Access database that are linked to an Excel spreadsheet. Microsoft's patch simply removes this functionality.

An update now exists to replace the technology with a different method of performing the procedure, however, companies that rely on using linked tables in Access have quite a bit of work ahead of them – especially if they decided not to act when the original judgement was handed out last year – to make sure their current setups work correctly with Microsoft's workaround.

You can read more about the update here: **support.microsoft.com/kb/904018** and here: **support.microsoft.com/kb/904953**.

THEN & NOW

RAM
While we take it for granted today, Random Access Memory – and especially the type we use now – wasn't always available. Back when horses pulled carriages and witches were burned at the stake, we had to rely on more mundane ways for storing data. Here's how things advanced.

EDO RAM Extended Data Out RAM replaced the Fast Page Mode RAM that had been prevalent for so long. This new type or RAM, with its low costs and increased performance would see the extensibility of the PC grow, with everything from video cards to L2 caches using it.

1966

1993

DRAM Created by IBM researcher Robert Dennard, the first iteration of dynamic RAM would see the replacement of valves, punchcards and other complex storage systems. True, it operated at speeds so slow they would put glacial melting to shame, but DRAM had a bright (and volatile) future. Note that we couldn't actually find a picture of some DRAM – it would have been very similar in appearance to the chip we have here though.

UPDATE

Avast, ye land lubbers!

Craig Simms gets on board as
The Pirate Bay sails again.

Ah, the Swedes. Never taking kindly to other nations telling them what to do, especially America, it has for a while served as a haven for those who live in the grey area of the law – in particular, the infamous torrent tracker 'The Pirate Bay'. Earlier this month The Pirate Bay went down for a few hours – then came back with a message that its host, RixlPort80 had been raided by police, who had seized the servers. It seems the MPAA had finally convinced some high up authorities that the site needed to come down – and in fact crowed about the final downfall of the site in a press release.

'The actions today taken in Sweden serve as a reminder to pirates all over the world that there are no safe harbors for Internet copyright thieves ... we are glad that the local government in Sweden has helped stop The Pirate Bay from continuing to enable rampant copyright theft on the Internet'.

The Pirate Bay vowed to be back within two days, in a new country if necessary. Two days later as promised, The Pirate Bay was

back, and in its mocking style set the title of its home page to 'The Police Bay', its token sea vessel firing cannon ba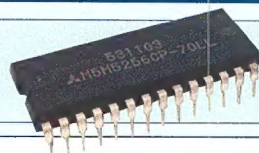lls at a Hollywood sign. Even the domain now points to The Pirate Bay. It seems the Bay is quite a harbour after all, and it's as irreverent as ever.

Recently the MPAA and RIAA have tried again with Russian web site AllofMP3, which allows cheap access to non copy protected MP3s in a variety of qualities sold by the megabyte rather than per song. Opponents claim this is possible due to illegal business practices, while proponents claim it's a loophole in Russian law.

Russian police are currently investigating, but during all this the heavyweight media bodies have influenced the US government, which has in turn decided to hold a hammer over Russia's head – they are willing to oppose Russia's entry to the World Trade Organisation if AllofMP3 is not shut down.

While downloading from the site to your computer in Russia is currently legal, you can bet your bottom dollar it isn't in other countries – nonetheless popularity is skyrocketing in the US and Britain.
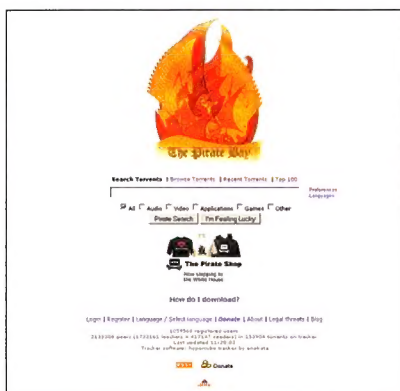
▲ **The Pirate Bay is back like some kind of proverbial flaming bird.**
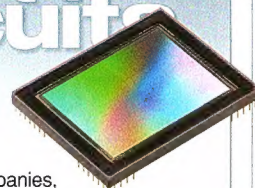
A 111-megapixel CCD has become reality, thanks to the work of two US companies, Dalsa Corporation and Semiconductor Technology Associates – and a bit of cash from the US Navy. Been playing around with your 8-megapixel Canon 350D and thinking you're pretty cool? Well, you're not any more.

Staying with CCDs, a new device capable of neutering image sensors in digital still and movie cameras has been developed by a group at the Georgia Institute of Technology in the US. It detects CCDs by taking advantage of their retroreflective nature and then shoots a beam of light at the sensor to prevent it from working.

Like racing cars? How about racing them with steering wheels? If this sounds like you, check out our GTR2 and Logitech racing wheel giveaway on *page 102*. We promise you won't be disappointed, but you will be amazed. Or stunned. Just check it out.

A few issues back (#64 to be exact) we accidentally printed the wrong picture for one of our competitions – the Xitel Hi-Fi link. Our apologies to Audion for the error. To make amends, here's the beautiful device in all its glory. Now that's what we call a sexy accessory.

In *issue 66*, we had a Short Circuit in Update concerning the changes to copyright law here in Australia to allow format shifting. These changes have only been proposed and it is still illegal to tape those *The O.C.* episodes. We apologise for the error.

Synchronous Dynamic RAM It wasn't until SDRAM that RAM really started to make an impact on system performance, with speeds ranging from 66MHz to 133MHz. The concept of tweaking RAM to squeeze more from a PC really came into force about this time and by the end of the decade, EDO was a thing of the past.

Quad Data Rate & XDR DDR is still going strong, with DDR2 making headway and GDDR3 in use on graphics cards. Rambus is back with XDR RAM, a technology that has found its way into Sony's upcoming PlayStation 3 console, but not PCs. QDR isn't with us yet, but it just might be the successor to DDR.

1996   2000   2006

Double Data Rate & Rambus For the first time in its life, RAM was getting competitive. On one side of the fence there was AMD with DDR, and on the other Intel with its new Pentium 4 and RDRAM. Although Rambus' RDRAM was technically superior, it didn't take long for DDR to catch up, and before we knew it, Intel had discarded RDRAM in favour of the now ubiquitous DDR.

Who thought RAM could be so interesting? Actually, we did. Check Then & Now next month for more amazing events through history that may or may not be related to computers. Or even technology at all.

COMPUTEX 2006

Ashton Mills explores a whole new world of great gizmos, cool gadgets and hot babes in Taipei, Taiwan.

atomic

Each year, for five days, Taipei becomes the most important city in the tech industry. With just over 1300 exhibitors spanning almost 3000 booths, spread out over four separate buildings, it's an adventure to walk the show and discover this coming year's cool gadgets and gear. Which is exactly what we did.

THE BIG GUNS

Computex is often used as a launch platform for many of the big names in the industry, and this year was no different.

AMD LIVE!

After a thoroughly boring launch event unleashed on the unsuspecting journalists by the company's rabid marketing arm, the company finally got down to business and made mention of the product we were all there to see – AMD Live!, a clear return shot at Intel's Viiv.

Live!, as it turned out, is a suite of software tools through which to access, manage, distribute and stream all forms of media from your home PC to pretty much anything, anywhere.

The demonstration was given of streaming a recorded TV show from a PC in Colorado to a laptop on stage. And it was smooth enough. The same media was then streamed to a PDA, with the software automatically re-formatting and streaming the video appropriate to the device.

So basically you could record that latest *Lost* episode, and stream it to your pal down the street or across the globe. We know you'll love this as much as Hollywood won't. If you have the bandwidth, you can stream your personal collections of music, images and video to PCs, PDAs, and even phones no matter where you're located. It gives rise to being able to do nifty things like recording and watching from your home PC, all managed remotely, even via a Web browser, with ease. This is really the selling point, because you can do all this now with the right collection of software and a bit of time to set it all up. AMD is hoping to take the legwork out for this, and get you using its system instead of a competitor's.

In fact Live! makes use of technology from Nero and Streamload among others – which brings us to the most interesting selling point: the ability to backup your media to central servers run by Streamload. We're not sure who exactly would feel comfortable doing that, but then such a service isn't really targeted at people like us.

> **"INTEL'S PRESENTATION WOULD HAVE YOU BELIEVE IT INVENTED NEXT-GEN GRAPHICS BEFORE NVIDIA DID..."**

Now obviously AMD wants to lock you into its platform, and so Live! will only operate with AMD CPUs (dual-core AM2, to be specific). You can find out more from **www.amdlive.com**.

Perhaps more newsworthy was the announcement of a reduced-power version of popular AMD CPUs running on as little as 35W with the same performance as their higher-powered counterparts. This plays into AMD's vision of the home media centre – with basic, quiet, case cooling (ie. one or two fans for flow-through air) and some of the CPUs passively cooled. Just think of the last time you saw a passively cooled CPU. Yeah, never, and yes we're ignoring VIA's chips for the EPIA boards, because they can't hold a candle to what a 35W 3500+ could do.

AMD also pimped its 4x4 grand-master world domination plans. You've likely already heard about this but if not, think SMP plus dual-core, with some changes to HyperTransport to allow better use of the cores (to have, for example, one core processing graphics in a game, one core doing AI, another running background Windows, and so on, but this would need serious developer support).

INTEL EXPRESS

Unfortunately AMD wasn't the only company to give its marketing department too long a leash, and the launch of what could have been a great opportunity for Intel was turned into yet another staged meeting of industry peers filled with rhetoric banter devoid of any content.

Fortunately, Intel did get into grit eventually and explained exactly what was new with the 965 Express and how it would be the perfect partner for the new Conroe chips.

The chipset comes in three flavours: P965, G965 and Q965. The Q variant features 'VPro', a vague set of features to enable better management in the enterprise, while the G variant includes an updated Viiv implementation (1.5) coupled with onboard graphics – in this case a new accelerator called the GMA X3000. Admittedly the X3000 sounds impressive – by Intel standards mind you – with support for Shader Model 3 and DirectX 9.0c. Mainly, though, it's positioned as an output device for media PCs, and integrates features like hardware de-interlacing for video. Intel's presentation would have you believe it invented next-gen graphics before NVIDIA did, so take any future capabilities of the X3000 you read with a silo of salt.

Intel pimped hard the incorporation of 'Fast Memory Access' technology that's new with the 965, which in essence allows the chipset to actively
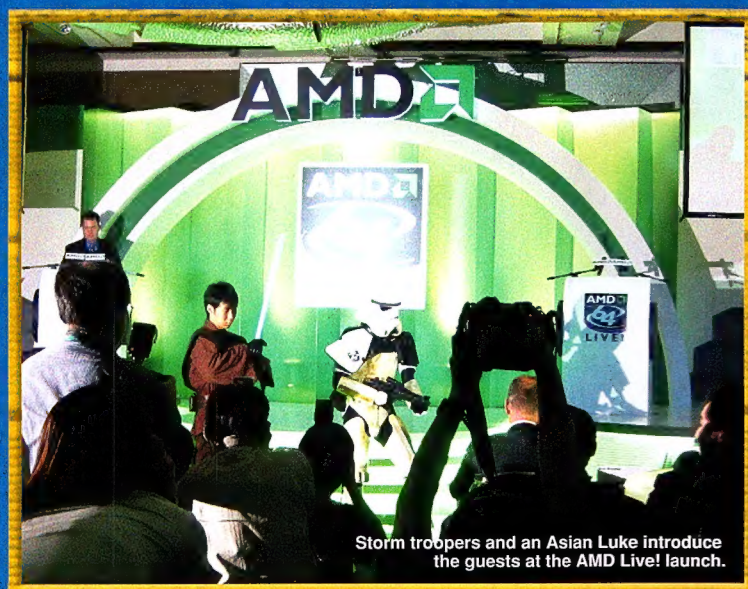
Storm troopers and an Asian Luke introduce the guests at the AMD Live! launch.
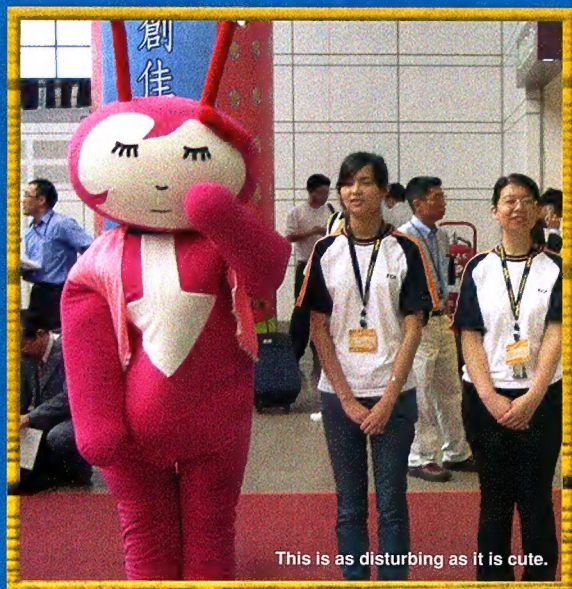
This is as disturbing as it is cute.

In this machine an X1600 provides physics to a pair of X1900XTX cards. The X1600 is connected through a PCI-E bridge to fit into an x1/x4 slot.

The 'pebble' demo with some 15000 stones bouncing and colliding off each other.

re-order requests on the fly. Intel looks to have achieved an even faster and more efficient memory controller for its platform, but we still think integrating it into the CPU die would be better.
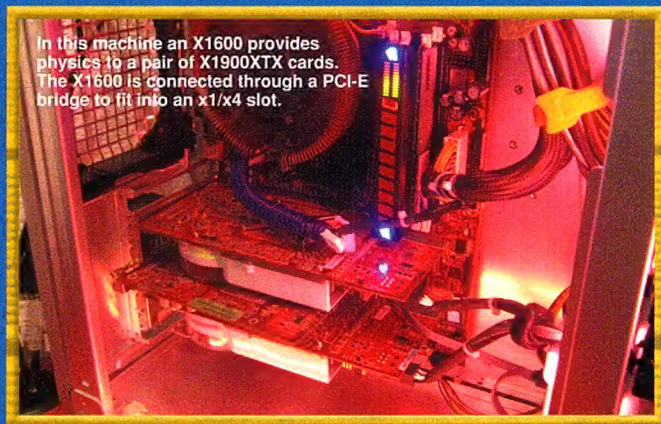
To end the launch Intel demoed a head-on benchmark using a modified office test of an FX-60 overclocked to FX-62 speeds versus a Conroe setup using the P965. The Intel setup severely spanked the AMD configuration by a factor of three, to which a front-row crowd of Intel staffers whooped and cheered. Yes, *whooped*. It was all so painfully rehearsed it would make you want to stab yourself with a pen.

Let's not forget we're talking one test here. And an office benchmark at that. So indeed while Conroe is Intel's hottest CPU yet, we're holding our judgement until we've given the new platform a thorough running in Labs.

PUREVIDEO

One announcement that almost got buried at Computex was NVIDIA's Purevideo HD, but not because of Purevideo itself – but rather what NVIDIA had to do to make it 'HD' (in reference to HD-DVD and Blu-ray content). As you'll know from last month's issue, HDCP is the future of playback content protection endorsed by Hollywood (see *Atomic 66, page 20*). Most current 'HDCP-compatible' cards on the market actually aren't. This is due to a necessary little chip called a key ROM that holds the decryption keys required to playback encrypted content being absent.

At least, up until recently.

Just how recently? When we quizzed NVIDIA about this very issue we were told two things: firstly that the 7950GX2 is the first card to include full HDCP support, including key ROM, from the outset but also that NVIDIA's partners are already shipping key ROM installed cards using the range of NVIDIA GPUs from lowly 6200 cards and up. But only as of last month.

This means that most users simply can't play HDCP content and will need to buy a new card in order to do so. When asked if there was an easy way for users to tell if their card was fully HDCP enabled, we were told there really wasn't any way to check except to simply play HDCP content. We suggested it might be useful to show this information in NVIDIA's drivers, to which we were told that was a mighty smart idea. You heard it here first, folks.

Purevideo HD itself looks rich enough, now with noise reduction and inverse telecine properties, and is set to compete with ATI's Avivo.

It's just good, finally, to hear that HDCP-enabled cards are on the market, but

one has to wonder why the heck it too so long for key ROMs to be included in the first place. All early adoptors have been burned by this.

ATI

Saving the best to last is ATI's 'boundless gaming' announcement. We mentioned in our AGEIA feature last month that NVIDIA and ATI wouldn't be far behind with their own physics technology, and sure enough ATI used Computex to demo its physics-on-GPU product.

Not only do we consider this the most interesting launch at Computex, but refreshingly we weren't bombarded by ATI marketers. In fact, they put us in front of techies with a clue. It was *fantastic*.

We got to see a number of demos similar in nature to the AGEIA ones, with hundreds of objects in motion with their own trajectories, all rendered smoothly on screen.

Two demo machines were on display. Both used two X1900XTX cards in Crossfire for rendering and a third card for physics. In this case one machine had an X1600, the other a third X1900XTX. ATI is quick to point out the technology is flexible, with users able to run a 1+1 configuration (one graphics, one physics, instead of Crossfire) and a 2+1 configuration (as above). Naturally, you'll either need a board with compatible PCI-E slots, and indeed the X1900XTX system used an Intel reference board with three PCI-E x16 slots, while the X1600 system used a bridge card to attach to a PCI-E x4/x1 slot. In fact, ATI was also quick to point out that physics doesn't use a lot of bandwidth and PCI-E x1 was sufficient.

ATI's technology uses Havok as its base. On the upside, ATI is working with more than just Havok for physics APIs, but couldn't tell us who the other companies were on pain of death. ATI said it would be more than open to work with AGEIA too, but clearly that would be suicide for AGEIA. What it means, though, is that more than Havok-enabled games could take advantage of ATI's solution.

On the downside, ATI's implementation requires an updated version of the Havok API, which means all current games are not compatible. While it's plausible developers could release patches for games to enable ATI physics support, it's unlikely to happen. As with AGEIA, it's going to be a case of games being built from the ground up with the new Havok (or alternative) APIs in mind.

ATI was happy to throw around some benchmarks stating the X1600 is twice as fast as a PhysX card –

And Geil's overclocker [illegible] with voltage adjustments [illegible] modules themselves.

some 1.1 billion sphere-to-sphere collisions/sec compared to the PhysX PPUs 530 million, and that the highly parallel nature and high clock speed of GPUs make it easy to scale this as well. In fact, according to ATI's benchmarks, the X1900XTX is up to nine times faster than AGEIA's PhysX. Of course, it's also twice the cost, but we'll ignore that for now. We pointed out these benchmarks didn't really mean much until a third party physics benchmark was available that would run on both AGEIA and ATI implementations (and rumour has it, by the way, that Futuremark is working on something).

Finally, and perhaps a little telling, ATI made note that the use of a PPU doesn't necessarily mean that physics processing is always offloaded from the CPU. In some instances, at least with ATI's implementation, physics does run on the CPU as well as the GPU, though he couldn't say where this divide occurs. The point being made was that a beefy CPU was just as important to drive a PPU, especially given the enabling factor of physics being another layer of effects and features that games can provide, and not merely accelerating certain effects to make the game run faster. As with everything else, we'll wait till we play with it in Labs to give our verdict.

GEMS FROM THE FLOOR

The best part of Computex is exploring the hundreds of new products on display. Some are from companies you know, some from those you don't. Here's our pick of the best from the five days at Computex.

MEMORY

Manufacturers including Corsair, G.Skill, Geil, Kingston and others were on the DDR2 bandwagon, showcasing their latest 1066MHz modules. With the advent of AM2, many of these companies are leaving DDR behind. Some even had DDR3 modules on display.

Corsair was trumping its alliance with NVIDIA for the Enhanced Performance Profiles SPD settings for NVIDIA's 'standardised' platform, but it will soon be one of many memory manufacturers with NVIDIA's blessing.

It was Geil, however, who caught our eye the most with its 'Dragon' DDR2 667MHz modules – all 4GB of them – and a retro-styled DDR2 pair with an in-built potentiometer for applying extra juice right at the PCB.

SHUTTLE

Shuttle always has something new, and this year the company was launching products outside the form factor that made it famous. Two new models include the SS31T, a 'mini-tower' chassis for Intel platforms that takes advantage of a hybrid BTX/ATX design, and the X100, an even slimmer design that packs in a Core Duo T2400, 120W PSU, and slim-slot DVD to become Shuttle's first complete PC on the market. The company had to make some design decisions to fit it all in, and so it's unfortunately not easily upgradeable except for the underside HDD. We got Shuttle to open it up and the innards look very much like a laptop, with copper heatpipes and a single fan keeping the system cool.

SUB MONITOR

ASUS had some interesting gear on display, including its AGEIA card, a new range of motherboards based on the 570/590 series, and a leather-bound notebook and mouse for the ladies.

But the most innovative kit on show was a 20-inch 2ms GTG LCD monitor – with webcam, satellites, and a subwoofer built into the back.

GAMER UPS

In Win had on display a new UPS aimed at the gaming market. The 'Elfer' UPS comes in models from 195W to 360W, features overload protection with automatic shutdown, surge protection, audible warnings, and about five minutes leeway to give you time to save your work (or game, presumably) and shutdown. It's not designed as an industry level unit, but then it won't cost as much as one either.

MAKING USE OF PCI-E

Tired of having those x1/x4 PCI-E slots on your motherboard doing nothing? Finally this year we saw a number of companies making the transition to PCI-E. The first was Compro, with its new range of HDTV tuners. While the company has updated its old PCI-based range, it also showed off the sparkly new E700 and E800 cards – sporting dual DVB-T tuners to watch and record two channels at the same time, support 1080i HDTV, and all through PCI-E. The E800 builds on this with analog TV and hardware-based MPEG2 decompression.

Promise was also onboard with a range of SATA RAID PCI-E controllers. With support for eight or 16 3GB/s SATA ports, RAID levels 0 through 6, and powered by an Intel IOP333 XScale IO processor they're designed for the enterprise. And hardcore geeks, as we pointed out to the Promise team.

SLI, IN A NOTEBOOK

Doubling up is just the done thing these days. NVIDIA had many things on display at its stand, most of them wearing skirts, but there was one utter beast of a machine that was just begging for some attention – Alienware's new Aurora mALX.

Sporting a 20-inch of screen loving combined with Go 7900GTX chips in SLI, it weighs as much as your grandma, but costs a lot more.

KEEPING COOL

Heatsinks were almost as common as the cases at the show, and sifting through the mire to find the more interesting one's wasn't easy. This lot stood out the most.

First there was Cooler Master's new 'Space Navi', likely named because of its UFO connotations – the cool thing here (er, pun) is that the fan is

Shuttle's 'tower' form factor chassis, the SS31T.

embedded in the centre of the heatsink. The cooler fits 775 and AM2 boards. The 'Hyper Sphere' sports a plastic moveable shroud that allows you to direct airflow, such as onto MOSFETs to help keep them cool.

Thermaltake had a ton of interesting products on display, but the standout ones would have to be its PSUs featuring a liquid-cooled PSU (though requires an external reservoir and pump), a dual-mode active/passive PSU that alters output depending on wether the fan is active, and a new Toughpower 1200W, with as many watts as you can read in the name! The company was also showing off updated Orbs and video card coolers that are reminiscent of Arctic Cooling's gear.

And on that note Arctic Cooling was showing off its Accelero coolers up to 7900GTX and X1900XTX, but has also now entered the market with a range of cooling and noise optimised cases in its Silentium range, for which the most stand-out addition is a hard drive muffler enclosure that sits on a suspended frame (for one HDD only, unfortunately).

And then there's Sytrin's VIAGRA. Yes, you too can give your PC a shot of VIAGRA, at least as a watercooling unit. Sytrin is the company that bought us the Nexterm case with internal air-conditioning for PCs. The VIAGRA unit is supposed to be totally silent, which was hard to tell among the din of Computex, but we'll be sure to get one of these units in and, er, go hard on it. Afterwards, we might actually test it, but we have yet to make up our minds.

SEASONIC AND SCYTHE

Some gear holds a special place in your psyche, and two companies whose product we like includes Seasonic's PSUs and Scythe, for its out-of-the-blue king of coolers – the Scythe Ninja.

Seasonic had a few new units on display that should make it to Australia real soon now. For S12 lovers, there's now an 80+ version available. The '80+' refers to the above 80 percent efficiency rating regardless of power draw. Many PSUs drop to 70 percent or below the higher the draw, generating more heat and using more power. There are very few certified 80+ PSUs available, so it's a welcome addition to Seasonic's lineup.

The company also had its first beefy PSU on show – the M12 700. Yep, you can guess it's 700W, and the 'M' refers to the modular design.

Scythe, being a small company, had just a tiny stand tucked away in a corner but this didn't stop us finding what was sexy and new.

What first caught the eye was a copper version of the Ninja – but alas though Scythe determined it to cool 2-3 degrees better than its aluminium counterpart, it decided not to go to market with it due to weight and cost. What was present however was its successor – sporting layered fins for twice the surface area and ten heatpipes. We can't wait to check this baby in Labs.

And that's a wrap folks! We're already right to go for Computex 2007. Until then, enjoy the little surprise below.

BABECAM

What Computex, or for that matter any technology show, would be complete without booth babes? Absolutely none, and rightly so. Let's just say approximately half of the camera's 1GB of storage ended up dedicated to these lovely ladies.

Enhance Memory Performance for Lifestyle Computing

ASUS M2N32-SLI Motherboard Incorporates Dual-Channel DDR2, AM2 processor and Unique Power Supply and Performance Adjustment Features to Bring Together Lifestyle and Personal Computing

Today let us take a look at the M2N32-SLI Deluxe, which is one of the first motherboards to support dual-channel DDR2 memory architecture and AMD's latest socket AM2. This board also offers some interesting and convenient features for efficient power supply and system performance adjustments.

## Dual-channel DDR2 memory and Dual PCI Express x16

Based on AMD's AM2 Socket processor, the M2N32-SLI Deluxe supports the dual-channel DDR2 architecture to provide higher memory frequency and bandwidth for overall performance improvement over previous AMD CPU platforms.

This improvement in memory performance enables the board to better run resource-intensive applications such as 3D graphics. The M2N32-SLI Deluxe (NVIDIA nForce?590 SLITM MCP Northbridge), comes equipped with two PCI Express x16 slots, allowing two identical SLI-applicable graphics cards to run simultaneously. Compared with dual-PCI Express x8, dual-PCI Express x16 delivers up to a 10% performance hike to boost image quality along with rendering speed.

Unique AI Lifestyle Features

AI Lifestyle Series has been known for innovations that are tailored for everyday computing needs. As the series' newest member, the M2N32-SLI Deluxe also has a few new features up its sleeves.

8-Phase Power design delivers steadier power supply for the CPU by generating less heat than conventional power solutions and providing a cool computing environment for stable performance and higher overclocking margin. It reduces input ripple current and output ripple voltage, preventing the CPU and power modules from the risk of high power stress.
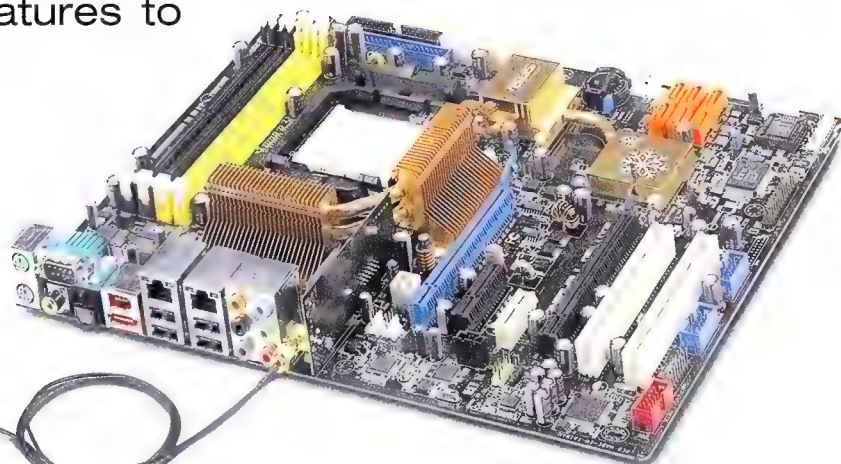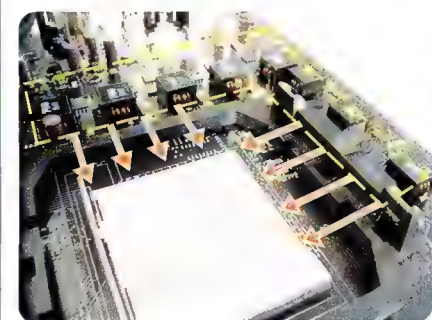
With **AI Nap,** users can instantly "relax" their PCs without terminating current tasks. System will continue to operate at minimum power and noise when users are temporarily away. It downloads files and run applications at the quietest state while users are asleep. Simply click on the mouse to wake up the system in seconds.

AI Nap
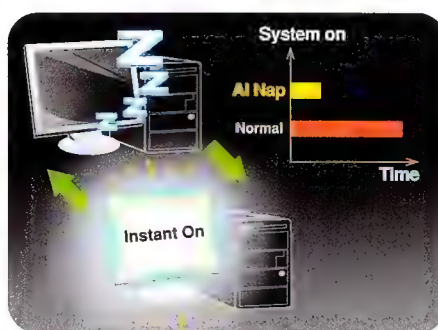
▲ Instant suspend your PC without termination current tasks

To balance system performance and silent computing, AI Gear enables users to choose from profiles to adjust CPU frequency and vCore voltage, minimizing system noise and power consumption.

The M2N32-SLI Deluxe bundled the sophisticated **Array Microphone**. Whilst recording, the microphone receives only the sound coming from the reception cone and ignores the sound coming from other directions, eliminating a large number of interferences including neighboring speakers and reverberations. It also features "Echo Cancellation Technology", which eliminates the annoying echo during audio and voice applications.

▲ The microphone receives only the sound coming from the reception cone and ignores the sound coming from other directions.

With enhanced memory performance and graphics capability to go with new AI lifestyle features, the M2N32-SLI Deluxe is ideally the foundation for building a system that will match your everyday computing needs.

Specification summary
AMD Socket AM2
NVIDIA nForce® 590 SLI™ MCP
Dual Channel DDR2-800/667/533
2 x PCI-E x16, support NVIDIA SLI at full x16, x16 speed
8 x SATA3.0 Gb/s including two external port / 1 x Ultra DMA
Dual Gigabit LAN
ADI AD1988B 8-CH (HD)/ DTS Connect

RISE OF NATIONS
RISE OF LEGENDS

MAXIMUM POWER COMPUTING
atomic
TOURNAMENT

They built, they fought, but only one conquered.

Atomicans gathered from around the country to compete in a fight to the death. Rise of Legends had landed and naturally Microsoft thought the best way to show off its multiplayer capabilities was to gather eight Atomicans and pit them against each other in a battle royale.

This was an *Atomic* event, which means it wasn't an ordinary LAN game. The Gold Class cinemas at Bondi Junction showed the audience what the players saw on their own screens, filling the venue with energy. Epic battles became legendary with the aid of supporters, monster couches, Mexican waves, drinks, cameras, giveaways, *Atomic* trivia, running interviews, the *Atomic* Angels, and of course, the unmistakable *Atomic* feeling of community and camaraderie.

As the night progressed, casualties inevitably piled up. The crowd throbbed, pulsed and cheered off the defeated players, all of whom were good sports. One by one they fell until the final standoff emerged, coming down to Silhouette and The Prophet. The battle raised hell, going all the way down to the wire, eventually hitting the time limit set... leaving one winner. Once the post game statistics were announced, Silhouette fell, congratulated The Prophet, and the crowd went wild.

Thanks must go to Microsoft for giving us the chance to show off such a wonderful game in spectacular surroundings, Samsung for providing the beautiful 21" monitors, the *Atomic* crew for organising and running the event, and the Atomican community for making the evening such a success!

L to R: The back of DF and Sil's heads, the front of AD, Fenn and Gharfield, all thrilled at the goodies in their showbags.

The best way to show off its multiplayer capabilities was to gather eight Atomicans and pit them against each other in a battle royale.
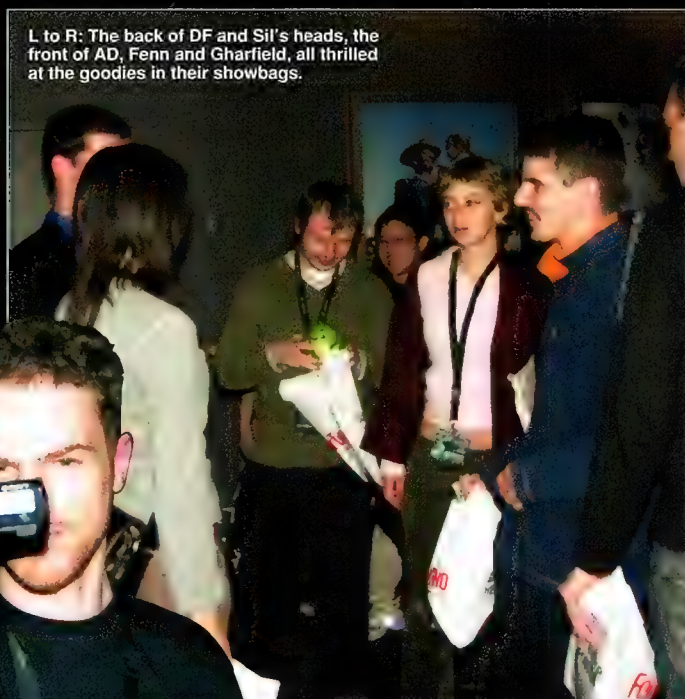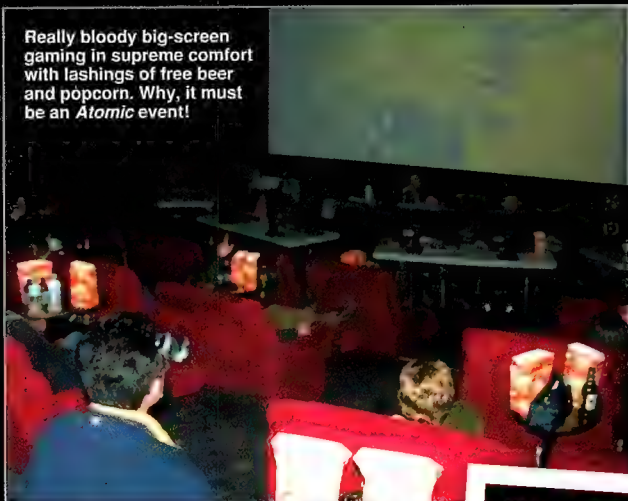
On the mic, on the camera, and just on it – give it up for MC Craig Simms!

atomic

Really bloody big-screen gaming in supreme comfort with lashings of free beer and popcorn. Why, it must be an *Atomic* event!

Ben interviews The Salty Peanut for the video of the night which you can view on the *Atomic* site right now!

Rapt attention as the game gets underway, with plenty of cheering and jeering to boot
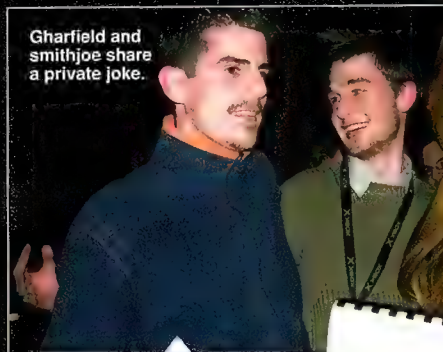
Hil60606 and Silhouette strategise Rise of Legends right out of the box

Microsoft's Rise of Legends was played and loved by all during an ultra-competitive night of friendly rivalry.

Gharfield and smithjoe share a private joke.

At the end of the night we had our winner – The Prophet models a RoL jacket, one of the many prizes he took home, not least of which being the fond memories of being a champion among Atomicans.

Lambo ponders where it all went wrong after being knocked out of the tournament early.

One of our *Atomic* Angels declares the Rise of Legends event a perfect '10' for funness.

atomic

15

FUTUREPROOF
TECH NEWS FROM OUR SHINY CRYSTAL BALL

Tubes or wires?
Logan Booker gets real small and checks out the latest in nano.

Nanotechnology has had a fair run in *Atomic* over the years – for understandable reasons. Firstly, nanotech currently holds the key to faster processors as traditional lithography techniques have become less capable of meeting demand – dual and quad core CPUs being the only answer. The second reason nanotech has often made its way into the hallowed pages of *Atomic* is because nanobots have long interested science fiction fans with tales of giant swarms of destructive little robots, and we all love sci-fi.

Unsurprisingly, we're once again talking about nanotech for the first reason (but we hope to write something fairly post-apocalyptic in respect to the second reason soon).

News recently reached the world from Harvard University in the US that nanowires – specifically nanowire transistors – could increase the performance of current PC processors by a factor of up to five, thanks to recent advances in nanowire manufacturing methods. Although such haughty claims have been made in the past, they have dealt mostly with nanotubes and methods so recondite that you would baulk at the printed whitepapers on the subject, which are so numerous they would consume the world's entire supply of trees three times over.

To be fair, nanotubes have shown that they could potentially be good for use in semiconductors, however most applications of nanotubes have been in high strength materials, heat sinks and funnily enough, nanowire construction. The reason nanotubes have stayed impractical for semiconductors is because they can't be artificially produced with any degree of consistency and so far the only way of creating a circuit with them is by manually manoeuvring their tips with an Electron Force Microscope. As you can imagine, creating a 125 million transistor CPU using an EFM would melt your brain faster than a single note of a James Blunt song.

Nanowires on the other hand are far more predictable. They are made of conventional materials like iron and gold (rather than carbon) and the procedure for creating a semiconductor of nanowires, called Vapour-Liquid-Solid (VLS), is in many ways similar to lithography.

It has taken some time however for nanowires to reach the same conductivity levels of nanotubes, and this is what has held the technology back. Many of the atoms on the 'edge' of a nanowire do not completely touch the atoms closer to the centre of the wire. This can cause a bit of a problem when the wire is only 20 atoms thick; nanowires can be extremely small – as tiny as 2nm. Changing the types of materials used in the VLS process can correct this.

Like any new technology, the machinery required to create nanowire semiconductors is expensive and not exactly ready for mass production. For now, we'll just have to accept 65nm dual core CPUs. While they're a great feat in engineering, they still rely on techniques that have been in use for over 20 years. Give us something new already!

FACTOMATIC

- The word 'tennis' is derived from the French 'tenez', the verb of which means 'to hold'.
- The city of Cairo in Egypt is the largest in Africa with a population of almost 7 million.
- Cutting or crushing fresh garlic creates allicin, a powerful antibiotic. Unfortunately, it doesn't last very long so if you're planning to make your own pharmacy, you might run into a few problems.
- In 1859, Britain was home to the first dog show.
- The element hydrogen was discovered in 1776 by Henry Cavendish. The word 'hydrogen' itself has its roots in the Greek words 'hudor' and 'gennen' which mean 'water' and 'generate' respectively.
- Light isn't the only thing that travels at the speed of light – so does electricity. A recent experiment showed that gravity also travels at this incredibly fast universal constant.
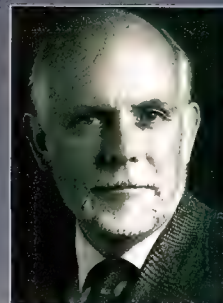- Eggs, along with many types of fish, are one of the few foods that contain Vitamin D.

BIOTECH RICHARD E. SMALLEY
When carbon had no where else to go, Smalley found buckyballs.

When one thinks of Richard Smalley, three things come to mind: his strong views on clean and renewable energy; the discovery of C60 (buckyballs) with chemist Harry Kroto – a new form of carbon that formed the foundations of nanotubes; and his ongoing and almost legendary argument with engineer K. Eric Drexler on the feasibility of constructing objects and materials using nanobots – a theory otherwise known as molecular nanotechnology. While Drexler believed the future of nanotech lay with tiny robots, Smalley was convinced that good old chemistry would play a more important part in pushing the field forward. As of today, Smalley's view has been the correct one with tech like nanowire semiconductors being made with vapour-liquid-solid techniques that make use of catalysts and phase changes – and not robots.

Sadly, Smalley passed away in 2005 at the age of 62 after a six-year battle with lymphoma.
Source: www.wikipedia.org

It certainly wasn't the first time an MMO got off to a bad start. Anyone who's been there on day one for just about any MMO will have tales of woe and server outages. However, what I experienced a few weeks ago must rate as not only the saddest MMO launch I have ever seen, but also the most pitifully ludicrous on record.

The game is called Seed, and it had me intrigued from the first moment I read about it. It's an entirely non-combat oriented MMO set in the distant future, when Earth has sent a massive colony ship to the stars to terraform a new planet. However, as in all such tales, something goes awry on route.

The central AI, Tau, wakes the thousands of genetically engineered colonists from their 'floatbeds' earlier than planned. They wake to find the terraforming operation in disarray. Machinery is failing, the AI has somehow become damaged, alien microbes are beginning to infect people and the population is rising out of control.

The beauty of Seed is that the gameplay is shaped almost entirely by the players. As it states on the website: 'Should they terraform or not? Make a habitat underground? Attempt to get off the planet? Alter their genetic structure to be more resistant to the alien environment? Time is running out?'

The prospect of such open-ended gameplay, which is all about social interaction, problem solving, and not merely killing things to earn bigger trinkets, was deeply appealing to me.

So, I signed up for the public beta, hoping to be in on the ground floor when this fascinating online anthropological experiment took off. Well, that was when the problems started.

After installing the open beta, I found I had trouble logging in. And on those rare occasions I could log in, I had trouble moving my avatar. And when I could move my avatar, I found there was nothing to actually do. And if I did actually find something to interact with, it crashed.

Now, all this is to be expected in a beta – to a point. I was always under the impression an open beta was a stress test and bug hunt rather than an experimental platform. However, I got the distinct impression I was playing an early alpha.

Then, things got worse. One day I tried logging in to the beta, only to find the game started downloading a patch – which said 'Live', no less!

I was stunned. I hadn't even had an opportunity to compile my several pages of bugs to send to the developers, and the game was going live?!

I checked the website and the forums, and lo, it was true, the game was going live. Insanity ensued.

Needless to say, the game hadn't improved much from the flaky beta. It crashed every few minutes; key features were not even implemented; there was no tutorial; an incomplete manual and there was very little to actually do in the game – assuming you could stay online long enough to even lament the lack of content. Even the dedicated (if delusional) community on the forums was shaken.
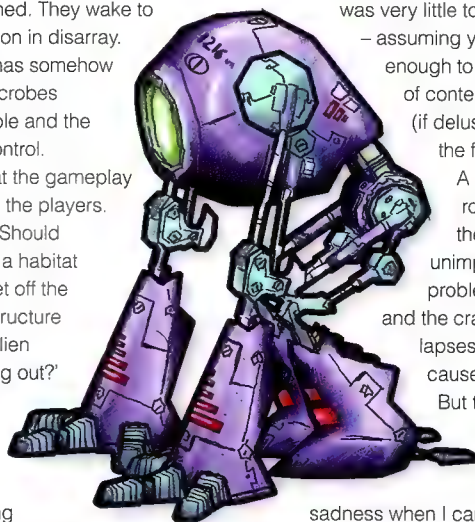
A few diehards tried to roleplay their way out of the chaos by claiming the unimplemented features were problems facing the colonists and the crashes were momentary lapses of unconsciousness caused by mysterious bacteria. But they weren't. They were just crashes.

I must say, it was a moment of great sadness when I cancelled my account after a few days. I truly had high hopes for this game. I still think, if properly implemented, it could offer a remarkable and unique gameplay experience.

Unfortunately, it has a long way to go, and I'm not willing to pay to be a beta tester, let alone an alpha tester. Sadly, at the end of the day, I think Seed is one game that will never germinate into the lofty and groundbreaking MMO it set out to be.

Tim wants to put the 'science' back into science fiction.
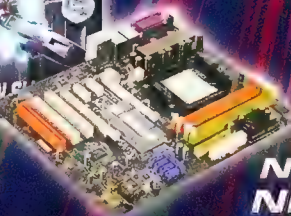**tim@atomicmpc.com.au**

ATOMICCHAT
TALKING TO THE FINEST HUMAN BEINGS ON EARTH...

David Braben

Logan Booker tracks down the man behind the greatest space sim of all time. Well, in the last 20 or so years.

Elite. To many, this word means little (which is odd because it actually means 'great'). To others, hardened by phosphor and repetitive strain injury, it is a game. A 'great' game. We chatted to David Braben, one of the men behind Elite, to find out why it was so, well, elite.

atomic How do you spend your time these days? What have you done since Elite?
David Braben Sailing, playing both computer games and board games. I'm currently enjoying Oblivion on 360.

Since Elite, I've started the company Frontier, which employs more than 100 staff, and written or designed many games since. These days I am part of a larger team, with games such as RollerCoaster Tycoon 3, and Wallace and Gromit: Curse of the WereRabbit under our belts. We're currently working on Thrillville – a console based rollercoaster theme park game, and The Outsider, a thriller.

atomic Do you watch or have an interest in sci-fi? If so, what's your opinion of shows like Battlestar Galactica and Firefly?

David Braben Yes, though most of the sci-fi films I've seen lately have been poor.

atomic With the advantage of hindsight, what are your final thoughts on Ian Bell, the lawsuits and the falling out? Is there anything you would have done differently?
David Braben Perhaps. At the root of the problem, or the falling out if you like, was Ian's unwillingness to continue working. This created an asymmetry in what had been a good partnership. The best thing would probably have been to have a clean break much earlier on.

atomic What do you think of the genre that Elite created?
David Braben The many games that followed, from Federation of Free Traders onwards, mostly didn't capture the feel of Elite for me. Pretty soon I stopped playing them. Interestingly, one of the producers on Frontier: Elite 2, Gary Penn, went on to produce Grand Theft Auto with DMA Design – which he described as 'Elite in a city'. For me, this captured some of the spirit – perhaps more so than many of the games
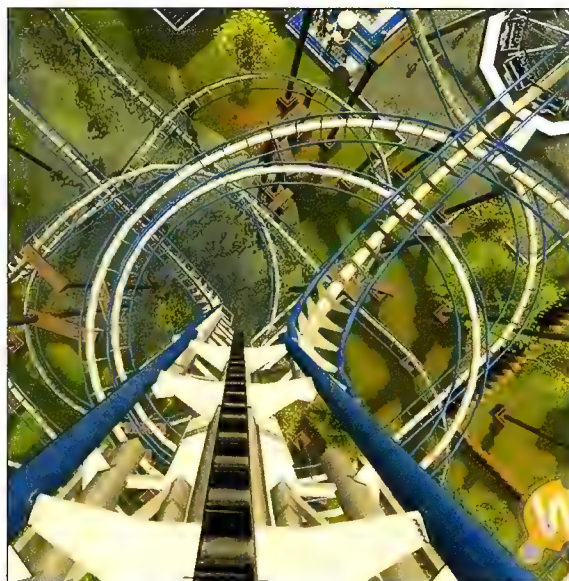
that more overtly tried to follow Elite.

atomic Elite and Frontier made extensive use of procedural content generation to squeeze an entire universe in a few kilobytes (or a megabyte in the case of Frontier). Can you explain how you came to the decision of using procedural coding, how much it influenced the

▲ **RollerCoaster Tycoon is just one of many titles produced by David Braben's games development company Frontier.**

game, as well as the pros/cons?

David Braben It wouldn't have been possible to get a game of the complexity of Elite and Frontier on those machines otherwise. Procedural generation is nothing to be afraid of. In many ways it made the game production process much easier – imagine in Frontier designing and testing 100,000,000,000 stellar systems, each of which had up to 100 planets. Clearly you wouldn't have that many – and they perhaps wouldn't have been so 'samey' – but at least with procedural generation, you know what the bounds of what you are going to get are.

atomic What do you think of the commercial, freeware, remakes, and open source re-creations that Elite inspired, like Vega Strike, Privateer, Freelancer, Hardwar etc?

David Braben Some are good, some less good, but they are still remakes of a game that is more than 20 years old! I think the sad thing is – more often than not – that they add little new to the mix.

atomic Would a future Frontier game still make use of procedural content, considering how far technology has come? Or would it use it in a different way, like generating graphics?

David Braben Frontier used procedural generation differently to Elite. Absolutely, it would be used in a different way. We already have a number of technologies working, planned for Elite 4 that use procedural generation.

atomic What makes an open-ended game in your opinion and how difficult is it to achieve this?

David Braben It is very easy to write an open-ended game, but very hard to make it compelling and fun. The challenge with genuine open-endedness is making sure that either there is the density of 'content' in there so that going in any direction *is* interesting, or that the player does know which way to go to achieve particular objectives.

atomic Do you play Eve Online? Do you believe there will ever be another single-player Elite-style game?

David Braben No I don't play Eve. As for another 'Elite-style' game, it depends what you consider makes Elite, but certainly we will be making a single player Elite game.

atomic At the dawn of gaming Elite created a desire for games that allowed the player to explore an unlimited world without specific goals. Why do you think there have only been a small handful of such games in all the many years since?

David Braben Marketing departments seem to hate the idea of a game without specific goals. Received wisdom is that such games don't sell, and that those that do are lucky aberrations. This becomes a self-fulfilling prophesy, of course, as the marketing people do make a big difference,

▲ **As you can clearly see, Braben enjoys a spot of sailing. Many spots actually.**

and if they are not behind a game, it may bubble under for a long time before it is truly successful – or disappear altogether.

Games like Elite, RollerCoaster Tycoon, The Sims, all were games that only got reluctant publisher support initially, but went on to stellar success. It makes you wonder what other games never saw the light of day but fell into this category.

atomic The simple graphics of Elite and other early games forced or allowed the player to use their imagination. Do you feel that current

games rely way too much on pretty graphics and fail to develop game worlds with any substantial creativity?

David Braben No. Modern games are much better. It is very easy to adopt a rose-tinted view of the past. It is true that a great deal was left to the imagination, but the imagination is still there. Just because more of a scene is fleshed out doesn't prevent you using your imagination still.

atomic Kittens or puppies?
David Braben Puppies.

▲ **Frontier is also responsible for Wallace & Gromit in Project Zoo.**

ATOMIC X-RAY LOOKING AT TECH FROM THE INSIDE

Megatexture

Logan Booker shows how id's John Carmack made everything old new again.

So what the heck is Megatexture? Unless you're mute, or lack basic cognitive abilities, this is probably one of many questions you've asked yourself since the announcement of John Carmack's new and supposedly fabulous graphics technology. According to Carmack, currently id's technical director, Megatexture makes large, high-resolution outdoor areas with hand-crafted detail possible, dismissing the cruddy solutions of today that rely on repeating the same texture over the entire landscape. Set to debut in Enemy Territory: Quake Wars, confusion is as rife as speculation regarding what exactly 'Megatexture' is.

In reality, the technique isn't as complex as you might think – and here's why.

Understanding textures

Texturing a 3D object inside a 3D area is not that hard a concept when distance isn't a factor – you can simply whack your textures at a fixed resolution onto each side of the object and you're done. Start moving your point of view (POV) backwards and forwards and changing the angle – like any first person shooter will do on a

nanosecond basis – and you introduce a whole new set of crazy considerations into the mix. Suddenly those pixels (or texels as they're called once they're on a 3D object) need to account for the change in perspective.

Of course, this is up to your video card and the graphics Application Programming Interface (DirectX and OpenGL) or API, to figure out. The distance and angle of each pixel relative to the POV needs to be recalculated and certain 'corrective' processes must occur. One such process is called 'mipmapping'.

Mipmapping generates a series of increasing lower resolution textures from the one high resolution texture. As the POV moves further away from the 3D object or views it from an angle where parts of the texture are closer to the POV than others, these 'mipmaps' or low-res textures are swapped into place. Depending on the degree of filtering performed on the textures, these 'changes' in mipmaps can range from imperceptible to the horribly obvious.

For indoor scenes, something most portal-based 3D engines like Doom 3 eat for breakfast, there's no need for an intelligent algorithm to

handle the mipmapping, caching and rendering of enormous pieces of landscape. Once you step into any outdoor area of appreciable size however, it becomes a considerable problem. Many games, including World of Warcraft and Elder Scrolls 4: Oblivion, deal with the outdoors by taking the same 256 x 256 (as an example) texture and repeating it 1000 times, with a bit of blending and shrubbery to mask the awful and totally artificial nature of the landscape. As you can see from the Oblivion screenshot on this page, it doesn't really work all that well.

What does this all have to do with Megatexture? Well, say you're playing a flight simulator, scooting a couple of kilometres above the Earth. You can't use a repeating texture – that's not what Earth looks like and a flight sim is all about realism. So, to render the landscape below in a believable manner, the 3D engine takes chunks of a massive artist-created landscape (or even aerial photos) and only displays what you need to see. Areas close to you are shown at maximum res, while those further away are resized and filtered to preserve memory. Basically, they're mipmapped.

To make that memory go even further, the textures are 'clipped' and mipmaps generated only for those clipped areas. This technique is called clipmapping and much of the Internet is under the impression that Megatexture is simply an improved version of this. This is not true.

Megatexture made easy

Clipmapping is a sophisticated technique that was fantastic back in 1996 when 32MB was insanely good but hardly enough to contain a high-res version of the Earth completely in RAM. Consumer 3D graphics cards were just a glimmer in a 3dfx chip designer's eye and most of the heavy-duty stuff was being done by the folks over at Silicon Graphics Inc (SGI). There are loads of whitepapers by SGI describing various implementations of clipmapping, but all are based on the same principles of carving up a big texture into manageable chunks and screwing around with intelligent caching techniques.

Megatexture on the other hand doesn't concern itself with all these convoluted steps

Landscapes are not hard at all to generate quickly, as long as you don't mind them looking worse than a fresh turd in a bowl of old porridge.

X-RAY
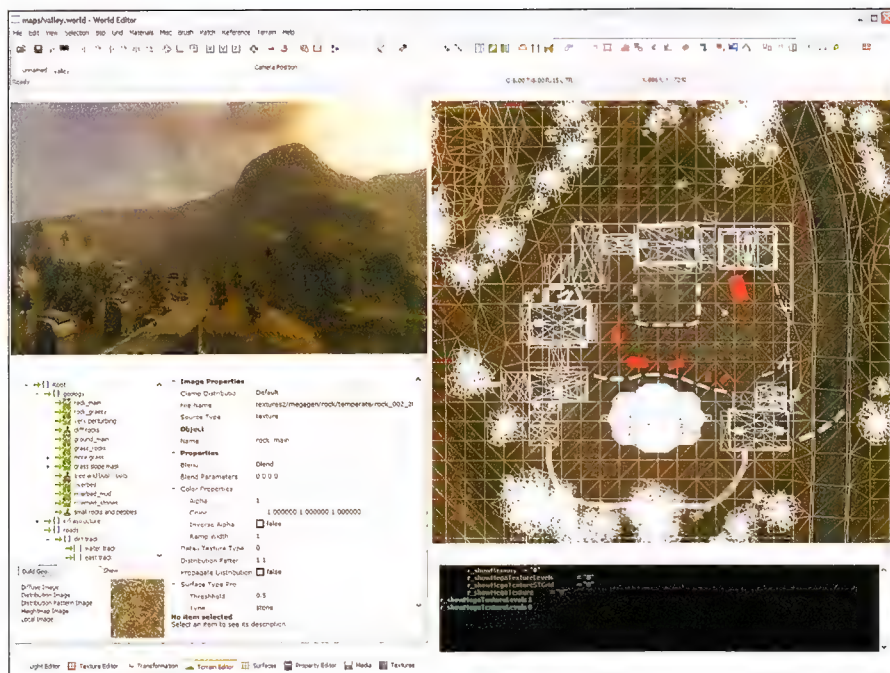
▲ **The world editor for Enemy Territory: Quake Wars in action. Mappers can tweak various settings to perfect the appearance of the Megatexture. There's even an in-game window so they can see how the map will look when it's played.**
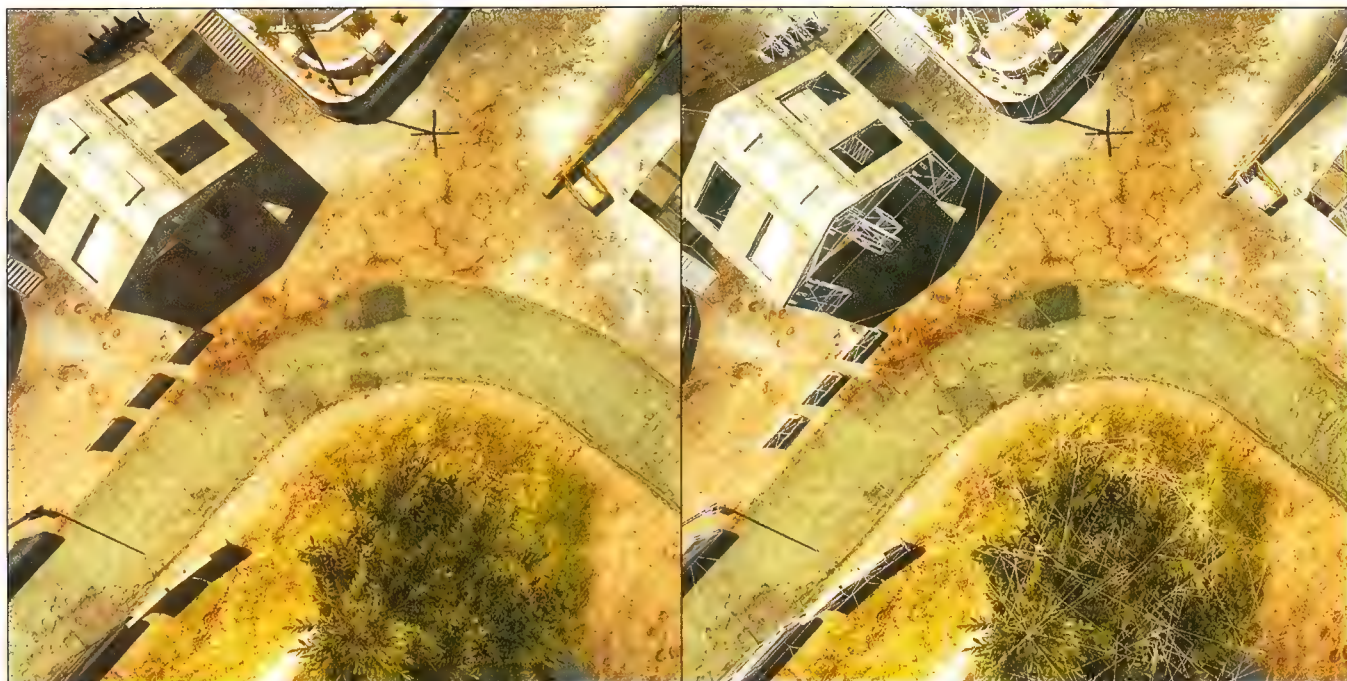
Yes, but is it any good?

For first person shooters featuring massive outdoor areas, Megatexture sounds promising. A flight simulator however, dealing with the Earth as one giant texture. might find it a bit too much to handle. In this case, traditional methods of texture carving and clipmapping are still the best option.

Carmack concedes that Megatexture was designed with 'bounded' areas in mind – that is, maps that have reasonable limits. Sure you can have flying vehicles in a game (as Quake Wars does) but they're not really going to go much further than the combat area.

The good news is that from the sounds of things, Megatexture will scale with hardware so in the future flight sims could take advantage of the technique. It isn't clear however if the technology is limited to the Doom 3 engine, or if other developers can use it in their own tech. Regardless, Megatexture could see more games in the future that escape the limitations of corridors and really explore the new gameplay opportunities of open spaces, without worrying about the technicalities

Let us not forget the Megatexture also allows artists greater freedom to customise the environment – from adding subtle changes in the look of each part of the map to make it truly memorable, to the way the ground sounds as you run across it and even how fast you'll need to run to counteract the effects of mud or rain. Megatexture has evolved so much during the development of Quake Wars that entire revisions in the game have been dumped because the capabilities have been superseded by Carmack's latest work.

Talk about possibilities!

– the method places its trust in the graphics API and the hardware. Essentially, designers create one large outdoor texture, just like it was going to be placed on one side of a massive cube.

In an online interview on Megatexture, Carmack mentions that a 'complicated fragment program', handles the loading and caching of the areas that will be seen by the player (check out the pictures below) but otherwise the graphics hardware treats the landscape like any old texture. There's no pre-carving of the landscape into manageable pieces and no clipmapping.

Megatexture also allows designers to attach unique sounds, friction and related values to an area, instead of a particular type of texture. So it's just not better for the visuals, but the entire gaming experience too – not to mention easier on the developers.

▲ **Here we have a top-down shot of a map from Enemy Territory: Quake Wars. On the left you can see the texture as it would appear in the game, while on the right is a shot showing how the texture is 'broken up' into polygons so the world doesn't look like one flat mess. This also allows the engine to display only those parts of the map the player can see.**

HARDCORE

NEWS, REVIEWS AND ROUND UPS ON THE LATEST HARDWARE TECHNOLOGY FOR YOUR BOX

I'm quite amazed that brand loyalty still exists. Me, I'm a bloke where I generally don't give a toss whether the motherboard in my PC is the same brand that I've been using for the last seven years or whether my graphics chip is manufactured by the loyal lads who created the last polygon pounding chip I purchased.

Nope, for me, it's all about the overall drool-worthiness of a component at any given time. I couldn't care less for flashy logos and pretty packaging – I just want maximum bang for my buck. Call me fickle, vacillating or even inconsistent, but I don't give a damn if a certain company has had a couple of wins in a row. No doubt by the time its next product rolls out it's all cranking on self-congratulatory laurels, and has allowed its R&D to slow. Meanwhile, one of the underdogs that's so close to that elusive killer app or component that if it can taste it, has spent countless weekends and late nights slaving to bring a better, more affordable product to market. It's such a predictable cycle, with the 'have poors' becoming the 'have nots', that it's unbelievable certain consumers stick to certain brands.

This is seen it over and over again with both CPU and GPU manufacturers: one year it's ATI or AMD's turn to bask in the silicon spotlight, then a couple of years later they'll be fighting to regain the lead from NVIDIA or Intel.

Don't tell the hardware manufacturers this though, as they'll stop trying to brainwash you with those bawdy advertisements with poor English and school girls. These branding focused ads help to pay the vastly overpriced wages of Atomic's freelance crew, and aren't too bad for the occasional bathroom session when your software compile is getting dated.

I bring up this point because I can see a storm brewing on the horizon. Actually, it's more of a typhoon of AMD-fuelled fatalities, bearing down on a ship named Conroe. It seems that the CPU manufacturer that everybody loves to hate is soon to release a chip that could only be called an Athlon crusher, and it'll certainly be interesting to see how devout AMD evangelists react.

Me, I'll be checking out the benchmarks and reviews to see if the pre-release claims stack up. If so, my current AMD loving soul will be sold to the devil faster than I can say 'AMD outside'.

Bennett loves his hardware a bit too much.
bennett@atomicmpc.com.au

short circuits

As expected, more memory manufacturers have jumped aboard the Enhanced Performance Profile boat, including Kingston, OCZ and Mushkin. Easier overclocking for all, eh?

The nForce 590 SLI Intel Edition has been confirmed and has made its appearance at Computex. So far DFI, ECS and Biostar have committed to the manufacture of the boards.

ATI has announced that the reason why you won't sacrifice graphics power in Crossfire for physics is that ATI expects you to add a third card to do the job. Rather than a different architecture, the third card is simply a Radeon X1K series that's dedicated to physics. Thankfully the third card doesn't have to be the same model as the first two, and in fact will run just as happily with only one graphics card. ATI claims the X1600 will be twice as fast as PhysX, and the X1900 will be at best 9x faster – although we'll wait to see whether this holds water when there's a common API or even any software to show off. Physics will also be enabled through Havok FX, just like NVIDIA, meaning AGEIA is in a spot of bother. See this month's Computex roundup for more info.

It begins. Google has fired the second open shot across Microsoft's bow, launching an online spreadsheet program (after it recently acquired online word processor, Writely). Of course, being an online program sharing is simplified – allowing multiple-user, simultaneous editing, and a chat window. It can interpret uploaded CSV and XLS files, and can save down to the same formats plus HTML as well.

As is usual in the US business world, the second Creative sued Apple for infringing on its interface patent, Apple countersued for infringing on other aspects of its digital player. Now Apple's hit again, taking them in for icons, displaying and editing data. Somewhere in the background, Smash Mouth's *Why Can't We Be Friends?* is playing quietly.

AMD 4x4
No, it's not a piece of wood, it's AMD's new board logic, explains **Craig Simms**.

AMD has brought the workstation hammer down in the desktop field, announcing a multi-socket solution for the enthusiast. The dual socket, dual core product brings a total of four cores into the fray, surprisingly before quad core on the one die. Each processor has access to its own set of memory, and presumably each other's although access to the foreign memory would be slower. There'll also be an edition that later supports quad core (based on AMD's K8L generation of chips), for a total of eight cores on the board. SLI and Crossfire will be a must – in fact the idea behind adding a second processor is to dedicate one entirely to managing the graphics cards, consequently alleviating any CPU holdbacks. As of writing, you'll need an FX AM2 chip as an entry fee for using the board. Fortunately, just like dual graphics cards, you can buy one processor and add another later.

Despite this, the price of entry is far too rich for most. SLI has proven to be a success, and no doubt some will snap 4x4 up for more performance, but just like quad SLI, right now 4x4 seems like no more than an effort to divert attention from the competition's superior products – it seems Core 2 Duo (look, it's tautology man person! Take the drugs away from marketing, folks) has AMD suitably spooked.

As you can see from the topology diagram below, the second CPU for some reason feeds through the first, but doesn't appear to have a direct connection elsewhere. Whether this is oversimplification of the diagram, or there is another technical reason for this, AMD would not confirm. No word either on whether we'll see a HTX connector on 4x4, or whether the board will support Torrenza – 4x4 may simply be limited to AM2 sockets.

Torrenza is AMD's new open platform essentially allowing a dedicated co-processor to be slotted into a standard Socket F Opteron socket. Cray has already developed a custom chip, and although admitting it was difficult, this opens the pathway to much more specialised chips that have fast and direct access to the system via HyperTransport, no longer being restricted by the PCI or PCI-E bus.

Finally in the AMD news fest, more K8L features have emerged, putting the chip on firmer ground. What we now know in total about the chip is that each core is able to shut itself down independently when there aren't enough threads to warrant use (known as DICE – or Dynamic Independent Core Engagement). It will also be 65nm, and L1, L2 and L3 cache will be 64KB, 512KB and 2MB respectively. More L3 cache will be added down the track. Each core has its own L1 and L2 cache, L3 will be shared across all cores. K8L has a DDR2 memory controller, but there is a migration path ready for DDR3, meaning we shouldn't have to change socket soon.

In the face of an increasingly aggressive Intel, it will be fascinating to see how the year ends for AMD.
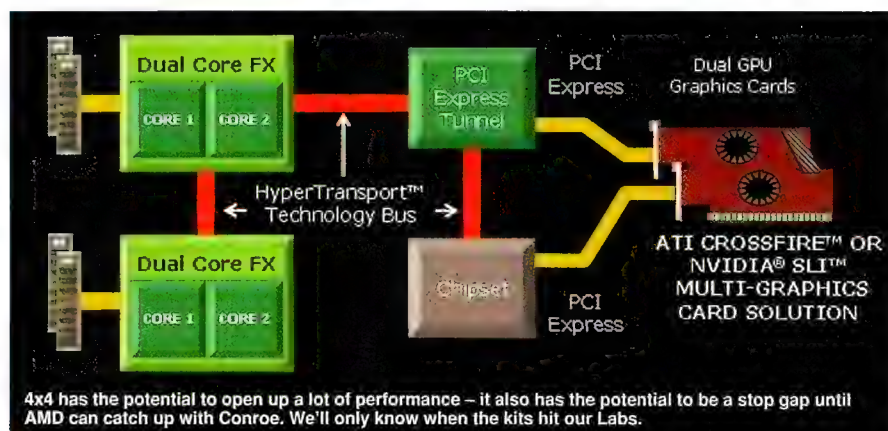
4x4 has the potential to open up a lot of performance – it also has the potential to be a stop gap until AMD can catch up with Conroe. We'll only know when the kits hit our Labs.

Foxconn says hello

The big boys are ready to play, says **Craig Simms**.

Foxconn has been pushing hard of late to get itself known in the retail market, entering the motherboard arena, partnering with NVIDIA for the 590 launch, and showing off its quad SLI rig at Cebit. Now, it's about to get in on the graphics market, too.

Owned by Hon Hai Precision Industry in Taiwan, the world's biggest (although lowest key) electronics manufacturing company, Foxconn's entrance into the market has made competitors understandably nervous due to Hon Hai's incredible resources and manufacturing capability. To give you a background, Hon Hai also makes several consumer electronics products such as Nokia phones and the PlayStation 2 console and employs more than 100,000 people. Its Foxconn division is even used by other brands to manufacture its boards due to its aggressive pricing and incredible output. Other customers include Apple, Dell, and Cisco. It makes motherboards, graphics cards, little plastic bits that cover processor sockets,

and connectors such as parallel ports – in short, it's bloody huge.

From what we've seen so far though, Foxconn's attempt to appeal to the high end of the market isn't quite hitting the mark, with its 'enthusiast' products often appearing and feeling a little like budget OEM – which is unsurprising, considering Foxconn's roots. Clearly some proper designers need to be brought on board, and for now Gigabyte and ASUS have nothing to worry about in regards to their premier brands. Foxconn is a strong player, which can't be understimated – and no doubt time will fix that.

One thing that certainly isn't budget is Leadtek, Foxconn's existing retail graphics arm. Leadtek has supplied quality products to the market for a very long time, but now Foxconn will be entering the market in direct competition. Unlike Leadtek, Foxconn plans to support both NVIDIA and ATI cards.

The slumbering giant has been awoken, and the villagers are mighty frightened.

short circuits

Some of Apple's MacBook Pros have been running 'warm' due to a thin film of plastic left covering a vent during the manufacturing process. The plastic is used to stop dust entering the computer during the process and is meant to be removed before the Macs hit the shelves. If it runs hot, and there's no plastic, Apple claims it's normal.

HOTᴏʀNOT

Your monthly guide to fashions and faux pas in the tech industry.

HOT	NOT
Neverwinter Nights 2	**Titan Quest**
A bit more depth to the hack and slash genre.	What's a Diablo?
ATI physics	**AGEIA physics**
Old cheap cards get new life.	$500 card flailing and sinking.
Dual GPU graphics	**Quad GPU graphics**
Giving a decent boost most of the time.	Apparently it'll work soon.
Procedural texturing	**Procedural texta-ing**
Making it up on the fly.	It just leaves a mess.

GROUND ZERO

GROUND ZERO
CRAZY TECH EXPLAINED FOR THE SANE

Game Over is nigh
Daniel Rutter thinks the world is coming to an end. Repent sinners!

I don't want to alarm you, but are you aware that the end of the world is coming?

No, it won't be Peak Oil or global warming. Pshaw. How ridiculous.

It's the computer games. They will be our undoing.

Come inside where the satellites can't see us, and I'll explain.

Imagine, if you will, the logical conclusion of the advancement of electronic entertainment. It's entertainment that seems totally real.

Yes kids, *The Matrix*. But the idea of perfectly immersive entertainment, as more than a vague solipsistic concept, has been around for rather longer.

The oldest sci-fi story I know of that postulates people 'jacked in', in the modern sense, to completely convincing fake worlds of fun, is *Spectator Sport* by John D. MacDonald, first published in February 1950.

In that story, a man travels far into the future and is rather disappointed to discover that bugger all has happened, because shortly after he left someone came up with VR entertainments, and ever since then the world's been dedicated to nothing but getting rich enough, by serving the VR entertainment system, to be permanently wired into it.

And why not? If such a system were available today, an awful lot of people would be very happy to be hooked up to it as often as possible.

This raises a bit of a problem.

You see, more and more immersive entertainment is definitely coming. Not jacking in, as such, but if 20 years from now we don't have immersive 3D displays with no visible pixels, I for one am going to want to know why, dammit.

Whatever we have in 2026, it'll be good, and a lot of people will be using it. And they won't just be using it as an alternative to going for a healthy walk or on a holiday to Great Keppel. Just as happens today with trash TV and various other utterly pointless activities (*cough* scrapbooking *cough*), they'll be playing games when they could be doing less frivolous things. Or, at least, when they could be discovering that less frivolous things, like reducing the amount of death and misery in the world, *aren't* being done by the people that could do them if they tried.

The better the entertainment gets, the more tempting they'll be, compared with everything else you can do with your life. People are already half-seriously talking about video game addiction. When you have the option of really and truly being the star of your own adventure movie, sci-fi epic or porno, you'd better believe that the games will have the mainstream time-sink capabilities of drugs today.

Well, hurrah, I hear you say. It's a free country/planet/whatever. I'll play Universe of Warcraft if I want. Especially if it rOXX0rZ.

OK, sure. But there's not likely to be much in those tantalising games that causes people to have sudden epiphanies, log off, and start frantically scribbling that long-awaited design for a clean fusion reactor made out of mudbricks. The games, by definition, will tickle your brain's reward circuits a lot better than anything 'real'. Real life will, just as in the sci-fi stories, start to be the less promising option, for those who have the choice.

The world's politico-religious loonies will, of course, keep right on with their ancient tradition. They'll declare everything not directly related to making more loonies Satanic; get rid of the infidels.

Hence: End of the world. Pasty-faced couch-mounted 'civilised' people discover to their surprise that game-training helps not one bit in a real-world fight against gun-toting extremist nutbags. Especially if the nutbags get themselves *elected* while you aren't paying attention.

The solution, as with speech, is not fewer games. It's more games. But it's a difficult coding challenge.

Your mission, if you choose to accept it, is to make a nice, simple, harmless game that's utterly irresistible to people who think their chosen deity loves *them* but hates everyone else. Go to it, people.

Dan lives in a world of his own. You are welcome to join him.
dan@atomicmpc.com.au

GEARBOX

AIPTEK mini PocketDV 8900 ▶

Supplier Anyware
Website www.anyware.com.au
Price $379

Although it doesn't feel like the most solid thing in the world, this tiny DV camcorder is actually not too bad. With 22MB onboard and 320 x 240 maximum video res, you're not going to be making epics any time soon. But it's easy enough to download from, and there's space for SD or MMC cards to expand its storage capacity. The menu sounds do get annoying after a while though.

◀ Maxtor 100GB HDD

Supplier Maxtor
Website www.maxtor.com
Price $299

What's better than a 50GB hard disk drive in a tiny, portable grey box? No, it's not a Cameron Diaz, it's 100GB! Maxtor has delivered with this terrific mobile storage device. Who needs an expensive 1GB USB flash when for a similar price you can have so much more? Transporting files has never been easier, and until someone invents a transdimensional data flux teleporter, it'll probably remain pretty darn good. And with cost per megabyte being as cheap as it is, you really can't go wrong.

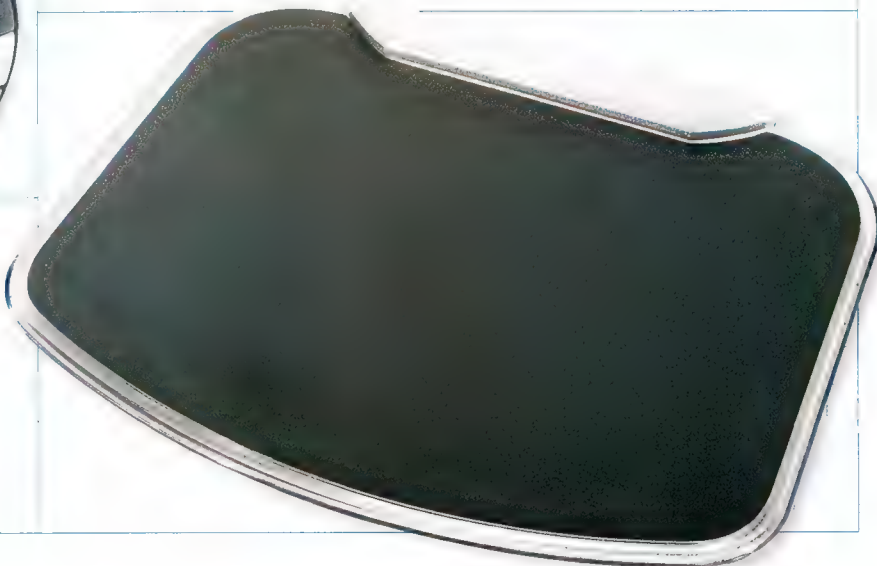## ◀ Blue Ant X5 Bluetooth Headset

Supplier Blue Ant   **Website** www.blueant.com.au   **Price** $199

Count the number of times you've almost strangled yourself on a cable. Now, think how many of those times it was a headset. There ya go little fella. Now imagine never having to worry about garrotting yourself with a pair of headphones ever again. That's pretty much what the X5 can offer you, allowing a completely cordless audio experience thanks to Bluetooth.

Light Mat ▶

Supplier Anyware   **Website**
www.anyware.com.au   **Price** $25

If they can integrate USB hubs into monitors, there shouldn't be much to stop them from sticking one into a mouse pad. And there isn't, because the Light Mat shown here has exactly that, along with a cool light so you can play games or arrange your song collection in the dark. Heck, you could even plug your mouse into your mouse pad!

Flexiglow Multi-tool
Supplier Flexiglow **Website**
www.flexiglow.com **Price $85**
Although we can't exactly remember when
we needed a pair of scissors *and* a 128MB
USB key at the same time, having both in easy
reach or indeed, in the same cute and portable
Swiss Army knife, could be handy. Thanks to
Flexiglow you can now own such a Swiss Army
knife, which also includes a bottle opener and
a Philips head screwdriver… if you so happen
to need to pull apart your fridge to grab
a bottle of moonshine. We know MacGyver
has probably done it at some point.

Everglide Mouse Mat

Supplier Everglide
Website www.everglide.com
Price $45
Roll it up, put your mouse on it or just
use it to mop up your mess! Actually,
this Everglide Mouse Mat is great for
the mobile gamer, or even the road
warrior, when those tiny crappy mouse
mats just won't do. Enjoy the smooth
yet accurate surface of this baby
wherever you go, and never worry
about being stuck with the back of
a magazine or a sheet of A4 again.
Unless you like mags and A4.

BILL'S REVIEW!

USB Missile Launcher
Supplier Tesora
Website www.tesora.com.au
Price $189.95

Thermaltake iFlash 12
Supplier Anyware **Website** www.anyware.com.au **Price $29.90**
A PC fan is nothing without some LEDs. Alright, it's still a fan, but not a very interesting
one. The iFlash 12 (not sure what happened to the other 11) features a set of two LEDs
in one of its fan blades, so you get treated to a pretty light display every time you turn on
your computer. In the words of Thermaltake: 'Coolall your eyes!'

BENCHMARK
HOW WE TEST, WHAT WE TEST, WHEN WE TEST IT

Benchmark. It's an odd word. It brings with it visions of a carpenter, hunched over, worn with the effects of his trade and age, focused on a single spot, etching a small indentation precisely into his workbench. A measurement of perhaps how long something was, or how deep something would cut – and hence how it stacked up, or performed compared to other somethings.

Fast forward to today, and it's the same thing, just with software, thermal goop and probably just as many sliced fingers.

3DMark05 and 06 are the legs of our bench, as freely downloadable tools they allow people all around the world to compete on a single platform, regardless of its indication of real world application, and keeping our table stable.

On the gaming surface, Call of Duty 2 takes first honours in the FPS department. Quake 4 follows closely behind for our OpenGL benchmarks, taking over from where the venerable Doom 3 left off and offering multiple CPU optimisations. Half-Life 2 remains, its market penetration simply too huge to ignore. X3: Reunion makes an appearance, in an effort to have a benchmark that is not an FPS. In the same line, Splinter Cell: Chaos Theory has also been added. Other games do exist. Honest.

All these tests are run at 1280 x 1024, 1600 x 1200 and 1920 x 1200 with vsync off, to cater for the most popular LCD resolution, CRT resolution and those who own widescreen monsters respectively.

To hit the CPU, we use LAME MT, a multi-threaded version of the popular MP3 encoder, which is used to compress a standard 30 minute WAV file. Similarly, VirtualDubMod is used to compress a standard 1GB raw video file into XviD at 1300Kb/s. Other CPU specific tests in our stable are Maxon's CineBench and SuperPi Mod. Rounding out the suite, SiSoftware's Sandra tests several subsystems across the board, while HDTach and ATTO Disk Benchmark helpfully provide hard drive scores.

All these tests are run on a Windows XP SP2 platform, running the latest official drivers available. Every test is run three times to eliminate any oddities that may crop up along the way, the final result printed in the magazine being an average of those scores.

Of course, all this is pointless without a standard set of hardware, and as such it is laid out below for the world to see. On with the testing!

BENCHMARKS

Graphics

3DMark05
Game tests only, 4xAA, 8xAF
www.futuremark.com

3DMark06
Game tests only, 4xAA, 8xAF
(SM2.0), 8xAF (HDR/SM3.0)
www.futuremark.com

Half-Life 2
Canals custom timedemo,
4xAA, 8xAF, all details highest,
HDR off
www.half-life2.com

Splinter Cell: Chaos Theory
Lighthouse Demo, Shader
Model 3.0, 8xAF, shadow
resolution high, all features on
www.splintercell3.com

X3 Rolling Demo
High settings, auto quality
control disabled, glow enabled,
4xAA, 8xAF
**www.egosoft.com/games/x3/
info_en.php**

Call of Duty 2
Hill 40 – Defend custom
timedemo, 4xAA, 8xAF, all
options highest
www.callofduty2.com

Quake 4
High quality, 4xAA, 8xAF,
Multiple CPU support, all
options highest
www.quake4game.com

Subsystems

HDTach
www.simplisoftware.com

LAME MT
**softlab.technion.ac.il/
project/LAME/html/lame.
html**

VirtualDubMod
virtualdubmod.sf.net

SuperPi Mod
www.xtremesystems.com/pi

Cinebench
www.cinebench.com

SiSoft Sandra
www.sisoftware.co.uk

Everest
www.lavalys.com

Others

DisplayMate
www.displaymate.com

ATI Tool **www.techpowerup.
com/atitool**

RivaTuner
www.guru3d.com/rivatuner

FRAPS
www.fraps.com
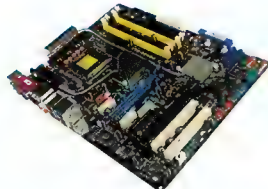
CPU-Z **www.cpuid.com**

Stress Prime 2004
sp2004.fre3.com

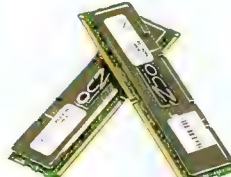## ATOMICBENCH Our standard hardware that gets regular Labs lovin'.

▲ Intel Pentium 955 EE   ▲ ASUS P5N32-SLI Deluxe   ▲ 2GB OCZ PC2-4200EB
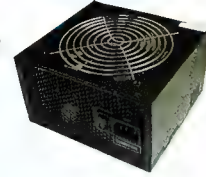
▲ Western Digital 1500ADFD   ▲ SeasonicS12 600W

▲ AMD Athlon 64 FX-60   ▲ ASUS A8N32-SLI Deluxe   ▲ 2GB OCZ PC-4000EB
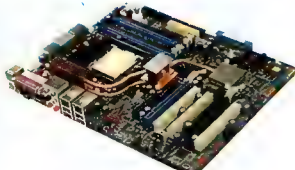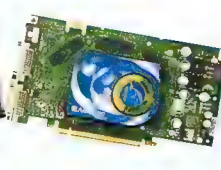
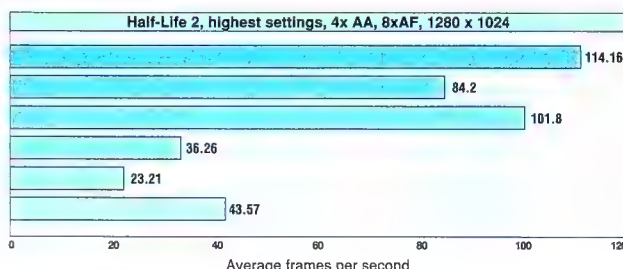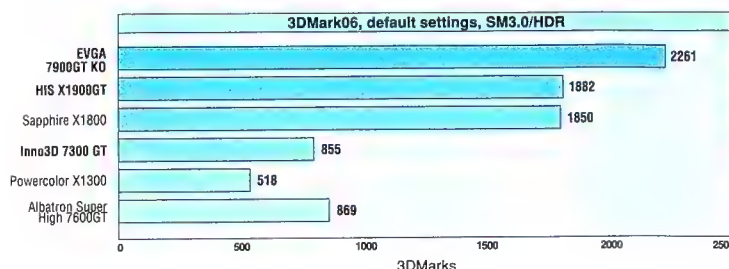▲ Dell 2405FPW   ▲ Albatron 7900GT

EVGA
e-GeForce 7900GT KO

GPU **NVIDIA 7900GT**
Memory size **256MB**
Core clock **580MHz**
Effective memory clock **1580MHz**
Memory type **256-bit GDDR3**
Pixel processors **24**
Vertex processors **8**
Video out **DVI; D-Sub adaptors;**
S-Video; composite; component
Video in **None**
Price **$580**
Supplier **Shadow Entertainment**
Website **shadowentertainment.com.au**

The 7900GT has done the hard yards, proving itself in the face of stiff competition. Sadly we don't usually get to see much of EVGA in this country, so we were more than excited when this card came into Labs. The KO editions are typically overclocked quite a bit, and this one follows suit by adding 130MHz on the core and 260MHz on the memory. Plus, you get the warm and fuzzy feeling knowing you're one of the few that owns one.

HIS
X1900GT

GPU **ATI X1900GT**
Memory size **256MB**
Core clock **575MHz**
Effective memory clock **1200MHz**
Memory type **256-bit GDDR3**
Pixel processors **36**
Vertex processors **8**
Video out **DVI; D-Sub adaptors; S-Video;**
composite; component
Video in **Composite; S-Video**
Price **$500**
Supplier **Altech**
Website **www.altech.com.au**

The X1900GT is meant to combat the 7900GT directly, but in most cases it just misses the mark. Nonetheless this red beastie from HIS romped well through the benchmarks like a rabbit jacked up on happy juice, meaning it will be more than welcome in most gamers' boxes. Unlike it's brethren, the X1900XT, the X1900GT purrs along quietly enough, so you can concentrate on fragging like you're meant to, instead of trying to shove pillows into your case to dampen the noise.

Inno3D
7300GT

GPU **NVIDIA 7300GT**
Memory size **128MB**
Core clock **350MHz**
Effective memory clock **667MHz**
Memory type **128-bit GDDR2**
Pixel processors **8**
Vertex processors **3**
Video out **DVI; D-Sub**
adaptors; composite
Video in **None**
Price **$140**
Supplier **Altech**
Website **www.altech.com.au**

There's something quaint about graphics cards that don't have their RAM heatsunk. This little 7300GT is quiet, and like most cards of its performance level doesn't need extra power from the PSU. Unfortunately due to its tiny specs it gets slayed in the benchmarks, like Buffy going through a vampire holiday camp. Still, if you're on an uber restrictive budget, or building a machine for your parents, you could do worse than to pick up one of these.

3DMark06, default settings, SM3.0/HDR

Card	3DMarks
EVGA 7900GT KO	2261
HIS X1900GT	1882
Sapphire X1800	1850
Inno3D 7300 GT	855
Powercolor X1300	518
Albatron Super High 7600GT	869

Half-Life 2, highest settings, 4x AA, 8xAF, 1280 x 1024

Card	Average frames per second
	114.16
	84.2
	101.8
	36.26
	23.21
	43.57

A night in at the movies

Bennett Ring projects his thoughts.
He also tests a batch of the latest projectors.

The take up of projectors has been surprisingly slow, in part caused by the difficulty that retailers have in demonstrating them. In the same space required for a projector to strut its stuff, retailers can squeeze in a dozen or more high-margin plasmas or LCD TVs. It can also be argued that projectors aren't family friendly, as they require a darkened room to operate at their best. But if you do happen to have an area that is both wide and dark enough, there's simply no better way to spend your high-def dollars.

We took a look at six of the best HD projectors that are affordable to folks who reside outside of the Packer clan. Please note, for the purposes of this article, we're defining HD as anything with a native resolution of 1280 x 720 or better – we're not part of the techno tribe that believes 1080p is necessary to enter the high-def era.

Battle of two techs

When it comes to affordable HD projectors (we're talking $5000 or less), there are two formats raging a bitter battle that would make Apple and Microsoft's competition look like a schoolyard tiff. In the left corner is LCD (Liquid Crystal Display) technology, facing off against the might of DLP (Digital Light Processing). Each has distinct advantages and disadvantages, making the winner determined by the user's needs.

LCD

An LCD projector is based around three LCD separate panels, in the primary colours of red, green and blue. Light is passed through these panels, and individual pixels open or close to allow the beam through. The light from all three panels is then combined to produce the final image. This method tends to produce an image that is brighter than DLP, as well as having slightly superior colour saturation.

However, LCD projectors are more prone to the screendoor effect than DLPs – this refers to the visual artefacts caused by spaces between pixels, which DLPs don't suffer from. However, the biggest issue Spielberg-wannabes have

with LCD is a perceived lack of contrast. Yet our testing showed that the gap has closed considerably in this regard, with DLPs only maintaining a slight edge.

LCD projectors also usually have lens shift, which means you can move the image around on your projection space. This is perfect if you're not going to ceiling mount the projector, or don't have a shelf that is precisely opposite the centre of your chosen viewing screen/wall.

DLP

This technology was developed, and is still controlled by, Texas Instruments. Rather than using three separate LCD screens, a DLP chip is used, comprised of thousands of tiny mirrors. Each mirror represents a single pixel, and each of these mirrors can reflect light back through the colour wheel.

In the lower end DLPs that this article is concerned with, a single DLP chip is used. The light from the lamp hits the DLP chip and is then passed through a rotating colour wheel, which has separate filters for the primary colours. As a result of this rotating colour wheel, some viewers notice a rainbow effect, especially in dark scenes with fast moving bright objects.

If you're susceptible to this effect, (many people are, especially the frag-honed eyeballs of gamers) it's a killer of a problem, leading to eye fatigue and even nausea. More expensive DLP projectors use a separate chip for each colour, and as result don't suffer from this, but we're too poor to even score a review sample of one of these high end DLP beasts, let alone recommend one for your purchase.

Cheaper DLP projectors are now resorting to colour wheels with more segments which rotate at faster speeds to help solve this issue. As a bare minimum, we suggest a colour wheel speed of 4x.

But we've heard there are people who don't notice the rainbow effect (funnily enough, we've never met one though). If you're lucky enough to be one of these people, DLPs could well be the answer for you. They tend to have a better contrast ratio, and during testing their real strength shone through when gaming with the

360. Due to the image having less noticeable pixels, it was as if games took on another layer of anti-aliasing, with noticeably fewer jaggies than seen on crisper LCD projectors. The rainbow effect was also less noticeable when gaming.

Running costs

Projectors used to be very expensive to run thanks to their exotic light bulbs, which were built entirely of metal mined on Mars by a small robot army. However, most projectors now offer a globe life of somewhere between 2000 and 4000 hours, depending on whether you run at full brightness or economy mode. At around $500 for a globe, the per hour cost is therefore between 12 and 25 cents per hour. This is a little more affordable than the local cinema house, which is approximately $8 per hour, per head. And besides, cinema-house films can't be paused when you need a toilet break.

How we tested

All projectors were tested at a range of approximately 5.5 meters, in a perfectly dark room, with the viewing receptacle (aka couch) four meters away from the projected image. No screen was used – instead a plain matte light grey wall did the job to our satisfaction. Obviously a screen would return even better results, but at least all test units were equally handicapped, and the image quality remained nothing less than impressive.

All projectors were first calibrated by eye using Digital Video Essentials. To test video, a Samsung HD850 DVD drive was used, set to upscale the PAL image to 720p. The opening chapter of *The Matrix* was chosen as our test scene, as its dark nature lends itself well to picking out those projectors with poor contrast.

Gaming was tested using the Xbox 360 via component out, set to 1280 x 720 at 60Hz. Both Oblivion and Project Gotham Racing 3 were used – Oblivion due to its first person nature and dark Oblivion gate levels, while PGR3 just looked great. A healthy supply of popcorn and choc tops was kept on hand for all tests.

DELL 5100MP

Projection type **DLP, 1400 x 1050, 2x speed 4-segment wheel**   Price **$3999**   Contrast **2500:1**
Brightness **3300 ANSI**   Inputs **HDMI, component, S-Video and composite**

We've reviewed the 5100MP in the past and thought it did a good job of pumping out big screen images. Sadly time hasn't treated it well though – when compared to the best on the market it now looks decidedly average, if not downright poor.

After burning the Dell logo permanently into our retinas courtesy of the miniature sun that is the globe within 5100MP, we were left with no doubts as to which projector was the brightest of the lot. It's also got a scorchingly high resolution of 1400 x 1050, which will be appreciated by home theatre PC users. It's just a pity then that the 5100 has more rainbows than Kermit would know what to do with.

The archaic 2x colour wheel resulted in this projector having by far the worst rainbow effect of the lot. Its brightness also had a side effect of blowing out highlights unless the gamma was turned down. The 1.20x zoom lens gave us one of the smallest images in the roundup, and a lack of lens shift requires precise placement.

The 5100MP's time as a home theatre projector has been and gone. It makes for a decent data projector, especially in bright environments, but doesn't cut the mustard when it comes to gaming and movies.

4.0 OUT OF **10**

TOSHIBA MT700

Projection type **DLP, 1280 x 720, 5x speed 6-segment wheel**   Price **$3999**   Contrast **2500:1**
Brightness **1100 ANSI**   Inputs **HDMI, dual component, S-Video, composite**

Before we'd even got to the projector when unpacking the MT700, we noticed that its remote bore a striking resemblance to the BenQ PE7700's remote. On unwrapping the projector itself, it was immediately obvious that these projectors are identical, bar a slight reconfiguration of the buttons on top. A quick Google proved this conclusion correct.

Therefore the same things we said about the PE7700 hold true for the MT700. It displays a great image, albeit one that rainbow warriors won't be able to stomach due to its DLP nature. Colours and contrast were both noteworthy, and while it's not the brightest DLP on the block, it's fine provided you control the light in your viewing area. The MT700 did have one small issue though, but we think it's probably just the sample we had. Light leakage from around the lens was very noticeable, and was so bright that it actually impacted on the projected image. As the PE7700 didn't suffer from this at all, yet uses the exact same chassis, we believe it was simply just a bad review unit.

Considering it's basically identical to the PE7700, make or break for this projector comes down to price. Somebody ought to tell the marketing folk at Toshiba this, because at $1300 more expensive than the PE7700, there's simply no reason to even consider the MT700.

5.0 OUT OF **10**

SONY VPLHS60

Projection type **LCD, 1280 x 720**   Price **$3499**   Contrast **1,700 – 10,000:1**   Brightness **1200 ANSI**
Inputs **Composite, component, DVI, HDMI, S-Video**

Considering its extremely high brightness rating on paper, we were quite surprised to see that our HS60 review unit was one of the darker projectors in the roundup. It could be that our sample had a tired bulb in need of replacement, as the HS60 has been around the block for a while, but for whatever reason the HS60 wasn't quite up there with the Z4.

This is a very novice-friendly projector, with minimal tweaking needed to get the most accurate flesh tones and decent contrast levels. Speaking of contrast levels, the HS60 is just like the other LCD projectors that quote stratospheric contrast ratios (such as the Z4 and AE900), utilising a dynamic iris which adjusts on the fly depending on the overall darkness of the scene. While it does help to increase contrast across both lighter and darker scenes, like the other dynamic iris projectors in the roundup there is a noticeable lag as the iris adjusts, which will infuriate purists.

With an identical street price as the Z4, Sony's offering is a decent contender, but doesn't quite offer the complete package of Sanyo's champion – and when you look at the Z4's superior colour, sharpness and contrast, there's no competition.

7.0 **10**

SANYO PLV-Z4

Projection type LCD, 1280 x 720 native resolution · **Price** $3499 · **Contrast** 7000:1 using Twin Iris Mechanism · **Brightness** 1000 ANSI · **Inputs** HDMI, dual component, D-Sub 15

We were tempted to give this projector the thumbs up purely because of the cool motorised door which slides away from the HAL-like lens when the Z4 is powered up. But it wasn't until we fired it up and saw its image quality that we knew we were on to something special.

Thanks to a 2.0x zoom range and lens shift, this projector can tolerate a wide range of room sizes. Minimal tweaking was required, with the various presets proving to be perfect for the differing uses of film and gaming, although we did need to knock the red level down a touch.

It was one of the brightest projectors in the roundup, and colours were breathtaking in their richness and accuracy. Considering the exceptional brightness, the whisper quiet operation is quite an achievement. Razor sharp images were delivered, and it synched perfectly with both input sources on the fly. A nice inclusion is the addition of dust ports – if you get a speck of dust on an LCD panel in a LCD projector, you'll notice a faint apple sized 'dust blob' on the projected image. The dust ports in the Z4 allow you to quickly clean the panels without having to take it into a service department.

The Z4 is a class above most other projectors, and its incredible brightness and strong contrast bring it in line with $10,000 DLP units. Highly recommended, and our pick for best projector in this price range.

atomic hotaward — 9.5/10

BENQ PE7700

Projection type DLP, 1280 x 720, 5x speed 6-segment wheel · **Price** $2700 · **Contrast** 2500:1 · **Brightness** 1100 ANSI · **Inputs** HDMI, dual component, S-Video, composite

Considering its RRP is less than $3000, we weren't expecting much from the PE7700. So when it proved equal to the more expensive IN76, we had no choice but to dish the PE7700 our coveted Value Award.

It must be said that the rainbow effect was visible when using the PE7700. However, thanks to its speedy 5x colour wheel, it exhibited this problem less than every other DLP projector in the roundup. As a result, we highly recommend you view the PE7700 in action, as there's a good chance you won't notice it at all.

No calibration was needed to get the best possible image quality – it doesn't get much easier to set up a projector than the PE7700. Unfortunately, due to its DLP origins, lens shift is not included, so you'll have to mount it in just the right spot. The 1.37x lens means you'll need to place it quite a distance from the screen to get the best image size. As to be expected from a DLP projector, contrast was exceptional, and the slightly softer pixels made 360 games look noticeably superior to the LCD projectors.

We walked away from the PE7700 very surprised – this is one great little projector. If it wasn't for that damn rainbow effect, we'd have absolutely no hesitation in recommending the PE7700 as the sub-$5000 projector of choice.

hotaward VALUE — 9.0/10

INFOCUS IN76

Projection type DLP, 1280 x 720, 4x speed 6-segment wheel · **Price** $4999 · **Contrast** 3000:1 · **Brightness** 1000 (video optimised – in reality this is brighter than ANSI) · **Inputs** HDMI, DVI, S-Video,

Looking like a spaceship out of *Close Encounters of the Third Kind*, the IN76 is easily the most distinctive looking unit of the bunch. Launching several months ago, at a couple of grand more expensive, InFocus obviously realised it was up against some stiff competition, and rapidly dropped the price.

Unfortunately it's still one of the more expensive projectors in the roundup, at around twice the price of the PE7700. Yet by no means could we claim that its image quality was double that of the PE7700, as the difference between the two is minimal. In fact, the PE7700 has (on paper) a faster colour wheel, and our tests show that the IN76 does indeed have a more noticeable rainbow effect as a result of its 4x colour wheel.

However, for the extra price you get one of the brightest projectors in this class, closing the brightness gap between LCDs and DLPs in this regard. Yet this has its own trade off – the brighter globe could well be the reason for the louder operating volumes of the IN76, as it likely needs more cooling than the competition. Image quality was very strong, although the contrast wasn't anything for the Z4 to start worrying about.

While it's a very solid performer, at this price, solid just doesn't cut it – it needed to stand head and shoulders above the rest.

6.0/10

Acer Ferrari F-20

Craig Simms takes Acer's latest LCD for a test drive.

Acer has been pimping its Ferrari co-branded products in a few different areas, and the latest, the F-20, is a sexy bit of kit indeed. Initially we pulled it out of the box to take a quick look, then left it on the table as we tied up some unfinished business before the review process commenced – during which everyone that passed by in *Atomic* HQ stopped in their tracks, then commented on how beautiful it was, or mentioned something about loins and stirring. The eye-catching red flies in the face of the black and silver combinations that we see everywhere today, making sure that the monitor stands out, and probably always will, among the crowd.

Apart from the mirror-finished black, Ferrari logo sitting on the front speaker grill, and the aforementioned red, this monitor is for all intents and purposes a re-badged Acer AL2032W with pretty bits, down to the specs. If you want to save $200 and still get the performance, you know where to go.

Inputs are plentiful, running the full gamut of DVI, VGA, component, composite, S-Video and some associated audio ports. The video input can be easily switched by a button sitting underneath the monitor's bezel.

Menu buttons are seated on the side, which is usually annoying but the functions are marked clearly on the front and aligned with the buttons, which are large enough to find blindly and easy to press – the up and down menu selection button usefully grooved in the middle so you can easily discern which is which. For once, a rare combination of form and function has been found in a monitor.

Unfortunately there is only one form of adjustment, being tilt. There is no height adjustment which we would expect for a monitor of this size, however it gets away with having no swivel adjustment by being light enough to shift the whole unit.

The screen is high gloss – something that falls into the personal taste arena, with just as many people liking it as those who prefer the 'matte' looking LCDs. The downside of course is that it's quite reflective, with the fluoros in Labs getting in the way of gameplay, although you soon get used to it.

The F-20 whirled through the DisplayMate tests, able to reach a 3 black and displaying all the way up to the maximum 255 white. This slight heaviness in the blacks carried on throughout the rest of the tests, however as a by-product offered a nice deep black not often seen in LCDs. Motion and gaming was fine, with both the HDTV and Quake 4 tests performing admirably. In fact we'd have to say this is the best 20" LCD to cross our desks to date.

Accessories include the required power brick, cables for every input on the monitor, and as a nice touch, a LCD cleaning cloth. A panel on the neck can flip back for cable management if needed.

The speakers are the usual monitor speaker trollop – we wish they'd stop doing this, especially on performance oriented monitors where any enthusiast worth their salt will have a decent set of speakers anyway, not to mention it might knock a few dollars off the final price. Unfortunately for the office crowd, integration is the buzzword. We'd love to be a part of any office that had these as standard, however we expect they're far and few between.

The Acer Ferrari F-20 is an excellent monitor that not only performs well, but manages to look stunning at the same time. If you need to set yourself apart, you could do worse than shacking up with one of these.
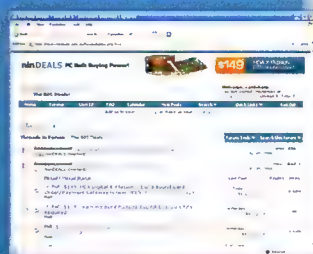
SCORE **8.5** OUT OF **10**

ABIT AT8 32X

AT8? Let's see if you can do 90, says **Craig Simms.**

Price **$264**
Supplier **Altech**
Website **www.altech.com.au**

Specifications **Socket 939; ATI Xpress 3200; ULI M1575; 2x PCI-E x16; 2x PCI-E x1; 2x PCI; 6x SATA; 6xUSB; Firewire 400; optical in/out; ALC882D sound.**

Now here's a name we haven't seen for a while. ABIT appears back on track after its buyout by USI, however this product seems to have come out the door before its name change to 'Universal ABIT' and the associated logo change. One can only hope in the process it ditches the Fatal1ty branding, as it's about as attractive to real enthusiasts as sanding your genitalia with a belt grinder, rubbing Deep Heat on it and then sealing it with a dash of lemon juice. Sorry Jonathan Wendell, we just don't want to be you.

Colour-wise the board looks like it's come out of the late nineties, sporting a similar colour to ABIT's legendary BH6. In fact, it's a board that's not particularly attractive at all, with the aqua blue heatsinks clashing horribly with the burnt umber motherboard, lavender and dark blue RAM slots. It's like being on Changing Rooms and waiting for the disaster, without Suzie Wilks to soften the impact.

Mind you, if you're tucking it away inside a case without a window, it really doesn't matter what colour it is, but in the days of highly stylised boards, the AT8 32X is a throwback.

In its favour, the board is passively cooled via some heatpipe goodness, giving it a tick in the checkbox of silent computing. Also in its favour is that its based on the wonderfully powerful 3200 Express chipset from ATI, matched with ULI's M1575 southbridge (a pairing unlikely to be seen from now on thanks to NVIDIA's buyout). If you need performance, you won't find it lacking with this little board.

Unfortunately the onboard options are limited and the design isn't so crash hot – in fact, the AT8 32X can be best described as a small disaster in board layout.

The main power connector is on the far side of the board, meaning your 24-pin PSU cable needs to snake across a good portion. The 12V pin is nested among a bunch of capacitors

between the back connectors and the processor. The molex connector for extra power to the PCI-E x16 slots is right down the end of the board, below the last PCI slot.

Even more confounding, next to the molex power connector is an FDD connector, which would be an utter pain to route a cable from to your floppy drive, having to snake it around all the add-in boards. The fact that it's even there is a bit odd, considering ABIT's stance towards legacy ports – in fact a quick glance reveals that the parallel and serial ports are indeed gone, leaving the FDD connector an enigma.

There are two PCI-E x1 slots for some reason, which as usual most people will struggle to fill one, let alone both. This really isn't ABIT's fault – the transition from PCI to PCI-E has been just as friendly as the ISA to PCI conversion so many years ago. And let's face it, it's going to be Creative that tips it over the edge.

Considering the X-Fi's relative newness in the market, it could be a while before anything develops on this front and the rest of the world follows suit.

Those who actually use the board for Crossfire with dual slot cards will as usual sacrifice one of their PCI slots, leaving only one available. This is an annoying proposition for those who already have a sound card, and want to add a physics card or TV tuner.

Two extra SATA ports are made available above the usual four, thanks to the Silicon Image 3132 controller. Unfortunately they're

placed near the controller at the back of the board, meaning cables will need to be snaked around the CPU HSF. Obviously shorter traces are better for performance, but definitely not for convenience. Usually this also indicates e-SATA being available, with the extra ports being managed by the same controller, however they simply aren't present, not even a passthrough bracket as Gigabyte is doing these days.

The rest is standard fare, with four SATA ports and two IDEs sitting at the bottom of the board, 7.1 sound provided by the Realtek ALC882D HD codec and Gigabit Ethernet by the Realtek 8111B controller. Optical in and outs are also provided, along with Firewire 400 and two USB ports. Two additional USB and Firewire ports are supported through an extra bracket.

The uGuru BIOS is nice and well designed, but nothing special beyond what we've seen with other vendor's specialised overclocking menus, especially in the face of NVIDIA's new wonder BIOS.

Thwocking in our regular testbench equipment, we found that the AT8 32X performed pretty much in line with other 3200 boards, as expected. It's all in the benchmarks to the right.

Considering the poor layout and lack of features, we recommend plonking down a few extra dollars for more features on a competing Crossfire board.
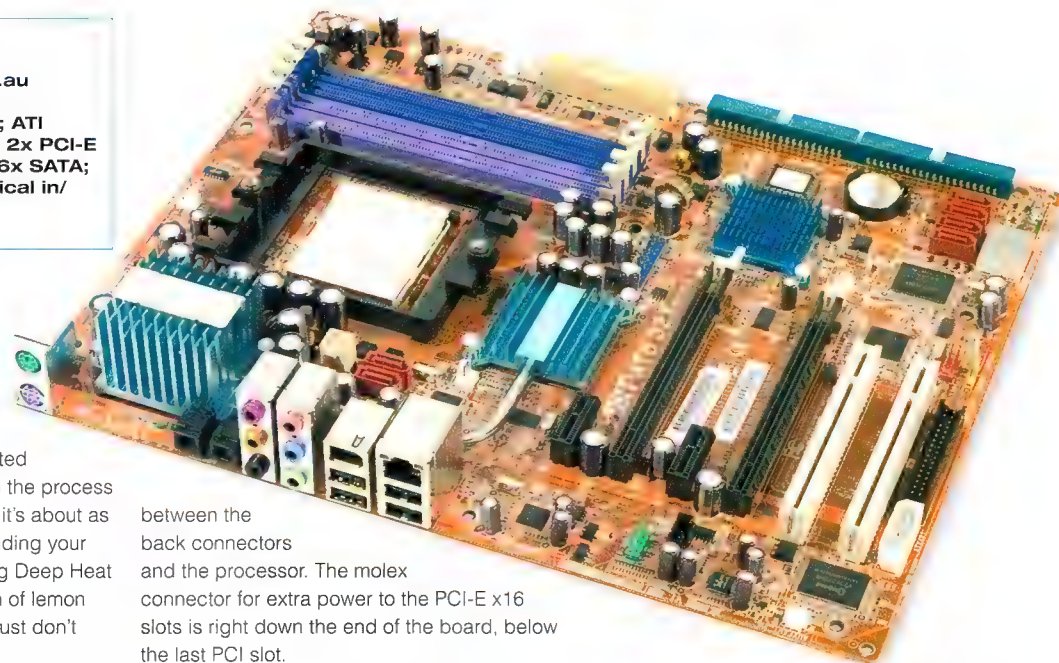
	ABIT AT8-32X	ASUS A8R-MVP32
Sandra 2007 Mem INT (higher is better)	5076	4988
Sandra 2007 Mem FLOAT (higher is better)	5031	4962
Half-Life 2 (CPU settings, average FPS)	163.02	169.10
Super PI Mod (lower is better)	2m 52.156s	2m 56.078s

SCORE **7.0** OUT OF **10**

Hiper Type R 580W

Price $189
Supplier Arena PC
Website www.arenapc.com.au
Specifications 580W; peak load 630W; modular; 120mm & 80mm fans; braided cables; high gloss titanium coating.

Hiper has recently made inroads into the Australian market, and has done so with a bang – particularly with its power supplies. That is, it made a good impression, not that its power supplies go bang, which would be a bad thing. Natch.

The Type R 580W turned up on our doorstep in what has to be the most impressive packaging of the year so far – a small and sturdy little toolbox with a flip-lock lid. Opening the lid reveals an inner tray which neatly stores all the detachable cables for this modular PSU, and we can easily see ourselves storing random computer bits in it after the PSU has been installed. Two thumbs up.

The manual even comes in black matt with silver lettering, immediately imparting the impression of quality.

Opening up the shiny, perforated box reveals a 120mm fan on top, and an 80mm fan at the back – both of which receive the hot-damn-it's-quiet-baby-sleeping-in-the-same-room seal of approval. If the blue and red colour scheme seems a little garish, you can even grab one in the standard black.

The modular system is easily among the best we've seen, with round, keyed terminators plugging into the PSU and then quickly screwed tight via a tool-less grip.

There's one PCI-E power connector supplied, one four-pin 12V and four molex connectors of varying lengths – which at first may sound too little, until you realise that Hiper has minimised clutter even further by providing extension cables to plug into the available molex connectors, all with a molex passthrough, giving you another PCI-E power connector, four SATA power connectors, three molex extenders and a floppy power connector. In fact the only downside we can think of is that the mirror finish is a fingerprint magnet.

If you need something modular, shiny, powerful and quiet, make sure you don't pass on this one. **CS**

SCORE 9.0 OUT OF 10

SilverStone NT01 v2.0

Price $63
Supplier Cool PC
Website www.coolpc.com.au
Specifications Heatsink for Socket 478/T/939; optional 60mm fans; backplate installation; copper base; three copper heatpipes.

Featuring a somewhat peculiar off-centre design, this heatsink sports three large copper heatpipes that are punched up through 32 copper fins. As it turns out, the strange design may have been the performance Achilles heel for the SilverStone.

If you don't own a motherboard with the appropriate mounting holes for the backing plate or would rather not have to bother with such a tedious system for an otherwise standard air cooling unit – given that there are, you know, reasonable retention mechanisms already in place – you are ruled out straight away.

Apart from weighing in at almost 600g – somewhat heavy for its size – the NT01 doesn't come with fans by default.

You can purchase two 60mm fans to clip on just in case you don't happen to own a case with egregious cooling. We weren't supplied with these, so we simulated an optimal case ventilation setting with a 120mm fan blowing over it.

Just so you know, we've fired Chernobyl up at 80W since the beginning of time (or thereabouts), rather than trying to adapt for newer CPU thermal levels. Why? Primarily because fluctuations in heat output occur with almost every major CPU release.

In order to produce comparative results, thus far, we've kept it at 80W, which also gives us the benefit of having every single cooler compared to each other on a level playing field, regardless of socket, attachment or testing methodology.

Slapping it on our heat-meister, Cherny, it produced a wholly unremarkable 51°C in a tepid 19°C ambient room temperature.

Overall, the SilverStone does get the job of CPU cooling done, if a little on the warm side, but whether that justifies the installation irritance is indisputably your call. **ND**
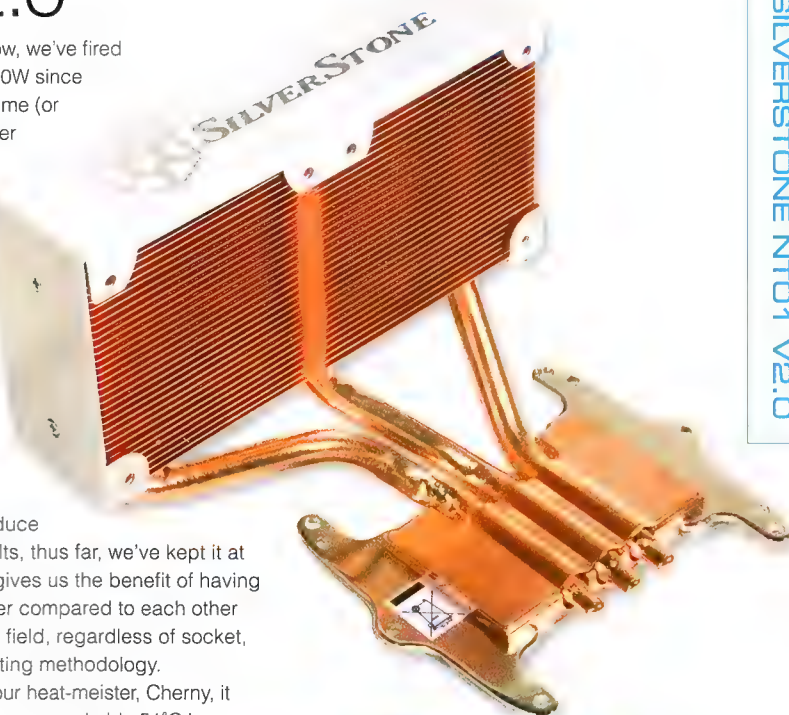
SCORE 6.5 OUT OF 10

WELLAND LANSHARE

Welland LanShare

Price **$120**
Supplier **Anyware**
Website **www.anyware.com**

Specifications **USB 2.0; Ethernet;
parallel ATA connection;
power pack.**

It seems with the advent of e-SATA that all manner of external cases are hitting the market, whether e-SATA enabled or not – and here's yet another that doesn't feature the new interface, but nonetheless has proved interesting enough to warrant a half-page review.

Welland's LanShare is an interesting hybrid beast, allowing the attractively styled case to be hooked up to the PC through either USB 2.0 or dumped on the network, Ethernet style. Don't get overexcited though, for the LanShare is an NDAS (Network Direct Attached Storage) device, not a NAS, meaning that you'll need to install software to access it and use its features, rather than handily being able to shove it on the network, have it grab its own IP and be accessible to pretty much anyone.

On loading the software required for the network connected functionality of the drive, we were required to enter a device ID and write key, which were located conveniently under

the drive we'd just mounted. Argh! Presumably this is for security's sake, although how this adds to security we're not quite sure – at the moment it falls squarely in the 'annoyances' category. After the device ID was entered, a SCSI driver had to be installed, and suddenly we were up and away.

After wedging in a 120GB Western Digital PATA drive into the tight enclosure and hooking up the wiring so the front light flashed a soothing blue whenever the drive was accessed, we hooked up over both connections and had a go at it with some HDTach lovin', knowing full well that the interfaces would limit the drive anyway.

Sure enough, USB 2.0 clocked in at 35.1MB/s burst and 32.3MB/s sustained, while the network connection clocked a significantly worse 10.5MB/s burst and 9.4MB/s sustained thanks to its 100Mb/s interface, although obviously this is also greatly dependent on network traffic.

If you have an old PATA drive hanging around

that you don't know what to do with, you could do worse than to whack it into one of these and reclaim some wasted space. We'll be waiting for the SATA/Gigabit Ethernet/e-SATA version, if such a beast is even on the road map. **CS**

SCORE **7.5** OUT OF **10**
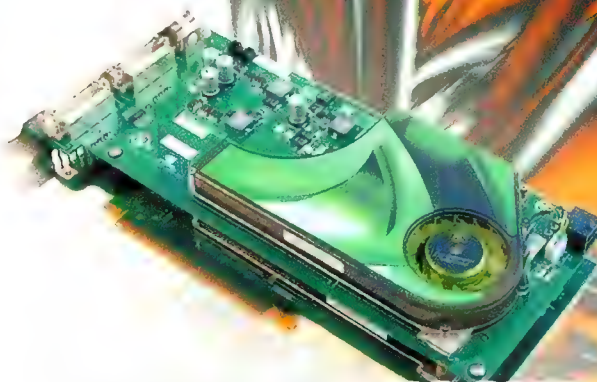
Aspire X-QPack

The X-QPack is the second micro ATX case this issue, but it occupies an entirely different price point to the Lian-Li PC-V300.

Unfortunately this is also reflected in the thickness of the aluminium used – the outer shell is very flimsy where it wraps around the sides. The insides thankfully are a little thicker, but still bend a little too easily for our liking.

The front is hard plastic, which you can get in purple, black, yellow, silver or green, and features a decent flip out handle for transport and an LCD screen that reports CPU and HDD temperatures. It does this through generic sensors you'll have to attach yourself, so except for the fact that the temps are pre-labelled, you can feasibly use it for anything that you can fit a sensor into. You can stop eyeing off your cat now. It's disturbing.

The entire inside lights up blue thanks to the 120mm LED fan at the back, with the interior amply shown through windows on three sides – while you wouldn't want to sleep next to it as a result, it's quite a decent touch for show-offs.

A 420W PSU is included, however you may wish to replace this with something a little more beefy and with more connection options – there isn't even a PCI-E power cable, and there's only one SATA power connector. Of course this could be solved mostly through adaptors, but even then having only three molex connectors limits your options.

There is a slide out motherboard tray but, as with the outer casing where the metal bends, it is worryingly weak. We'd hate to mount a fully stacked motherboard and then remove the tray, for fear of the metal fatiguing beyond repair. Connection to the motherboard tray is achieved through pre-joined standoffs, rather than attaching your own to the supplied holes.

The X-QPack certainly looks the part, but when you dig a little deeper the lack of quality manufacturing simply isn't worth the price paid. **CS**

SCORE 5.5 OUT OF 10

There's nothing sexier than new kit. And whether you need to horde your pennies (Budget), want the most power for your dollar (Performance) or own a small mansion and a collection of sports cars (Extreme), we're here to help with this handy matrix of *Atomic* recommended products. You may find your needs fall between categories – that's okay, just mix and match to suit your budget! Each piece of kit has been has reviewed hands-on in *Atomic*, so if you want to learn more look up the issue and page number listed.

	CPUs	Motherboard	Memory	Video card
BUDGET *I can't afford to eat... gimme gear!* **intel**	**Intel Pentium 4 6xx Series** PRICE $300-970 — Single core isn't dead yet, and the Intel 630 can be had for less than 300 smackaroos, satiating those on a shoestring.	**ECS RS400-A** PRICE $189 — This budget board uses the RADEON Xpress 200 chipset, offering a perfect 'in between' stage for those who need to upgrade slowly. Reviewed in Issue 57 – Page 40	**2x512MB PQI Turbo PC2-4200** PRICE $160 — If you can't afford the 2GB, stick with 2x 512 to get your dual channel bonus. Reviewed in Issue 59 – Page 39	**NEW ENTRY**
BUDGET **AMD**	**AMD Athlon 64 Series** PRICE $200-450 — If you can't afford dual core or don't see the point, the ol' faithful 3500+ still has quite a kick left in it at around $220.	**Gigabyte GA-K8VT890-9** PRICE $139 — Sporting VIA's K8T890 chipset, this board is perfect for the budget conscious but still packs a powerful punch. Reviewed in Issue 54 – Page 55	**G.Skill ZX Value DDR** PRICE $169 — 1GB is the bare minimum you'll get away with these days – stick these in for some decent grunt. Reviewed in Issue 58 – Page 44	**Sapphire X1800GTO** PRICE $380 — The crazy amount of punch delivered by this card is worth stretching your budget a little. Viva la RADEON! Reviewed in Issue 66 – Page 33
PERFORMANCE *Hardware that bangs the best for buck.* **intel**	**Intel Pentium D Series** PRICE $215-530 — Yummy goodness in an Intel wrapper. The Presler cored 940 is the best value currently at around $385, and should be able to stretch its legs in the OC stakes.	**ASUS P5N32-SLI DELUXE** PRICE $360 — It doesn't get better than NVIDIA's new SLI x16 platform and dual-heat-pipe cooling for the Pentium. Reviewed in Issue 59 – Page 45	**2x1GB PQI Turbo PC2-4200** PRICE $300 — PQI understands value, fortunately for us they also understand performance. Reviewed in Issue 59 – Page 39	**NEW ENTRY**
PERFORMANCE **AMD**	**AMD Athlon 64 X2 Series** PRICE $430-900 — Burning speed with an attractive price tag, the 3800+ is currently your sweet spot at around $430, and should overclock that extra mile you require.	**ASUS A8N SLI PREMIUM** PRICE $315 — This Crossfire mobo packs high quality ASUS design and affordability into one bundle. Reviewed in Issue 56 – Page 41	**2x1GB PQI Turbo PC3200** PRICE $360 — The PQIs impressed with their overclocking potential and low cost. Reviewed in Issue 59 – Page 38	**NVIDIA GeForce 7900GT** PRICE $450 — In the face of stiff competition from the much cheaper X1800GTO, the 7900 wins out purely because of the strength of the SLI platform. Reviewed in Issue 64 – Page 40
EXTREME *Gimme power. Money is no object.* **intel**	**Intel Pentium 955 EE** PRICE $1600 — Dual core is the future, and the future is inside this smoking chip with high overclocking potential. Reviewed in Issue 61 – Page 35	**Gigabyte GA-1975X** PRICE $360 — The 955EE and Crossfire have never been more at home. Plus turbojet wind tunnels! Reviewed in Issue 62 – Page 39	**2x1GB Geil PC2-5300 Ultra** PRICE $470 — The Geils screamed through our lab tests, proving their dominance for the Intel platform. Reviewed in Issue 59 – Page 39	
EXTREME **AMD**	**AMD Athlon 64 FX-60** PRICE $1700 — Unlocked multipliers and hot dual-core lovin' means joy. You can't go past the FX-60. Reviewed in Issue 61 – Page 35	**ASUS A8R32-MVP Deluxe** PRICE $320 — Back in black, ASUS rocks the house with dual PCI-E x16 slots for Crossfire. Reviewed in Issue 63 – Page 35	**2x1GB OCZ PC4000 EB Platinum** PRICE $500 — OCZ provides quality products for the hardcore – and this time is no different. Reviewed in Issue 59 – Page 38	**X1900XT Crossfire** PRICE $650x2 — If you can find a Crossfire Edition card, pair it up with a standard XT for max speed. Reviewed in Issue 62 – Page 37

KITLOG

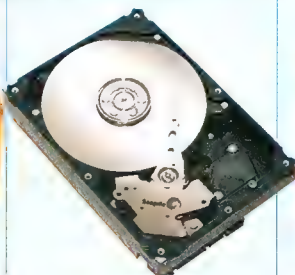| Coolers	System drive	Display	Speakers	Cases

Thermaltake Golden Orb II
PRICE $49

For such a large and effective heatsink the price is hard to beat. It's low profile too, so should fit in all sorts of cases.

Reviewed in Issue 58 – Page 37

Seagate Barracuda 120GB
PRICE $120

These 120GB drives are fast and sweet, and yet the price is right at around a dollar per GB.

Reviewed in Issue 53 – Page 41

BenQ FP71V+
PRICE $490

This 5ms 17in LCD is cheap and speedy, and plenty good enough for even the most fussy of grandmas. Send her your love today!

Reviewed in Issue 54 – Page 48

KOSS SB40
PRICE $110

You'll find that these circumaural boomers will do you justice just fine if you can't afford a THX 7.1 platinum plated surround sound setup.

Reviewed in Issue 38 – Page 30

Cooler Master Ammo 533
PRICE $115

Perfect for LANs with its heavy duty handle, military styling and rugged construction, the Ammo blasts the budget competition away.

Reviewed in Issue 60 – Page 50
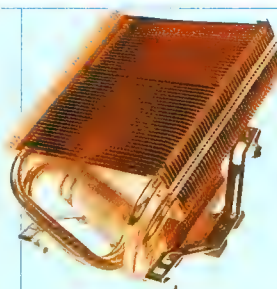
Thermalright XP-90C
PRICE $99

Thermalright built their business around effective coolers, and the XP-90C is one of the best money can buy. It looks secks too!

Reviewed in Issue 58 – Page 33
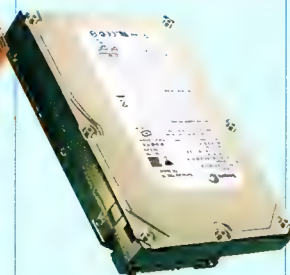
Seagate Barracuda 7200.10 750GB
PRICE $980

Seagate's fancy new technology makes this beast both fat and fast. We're almost at 1TB!

Reviewed in Issue 66 – Page 43

Samsung 930BF
PRICE $650

Clocking in at 4ms, this gorgeous 19in screen has a colour depth and tonal range that will make you weep with joy.

Reviewed in Issue 61 – Page 46

Altec Lansing MX5021
PRICE $300

This 2.1 set is for those after a decent yet simple setup. The next best thing before 5.1 sound.

Reviewed in Issue 47 – Page 85
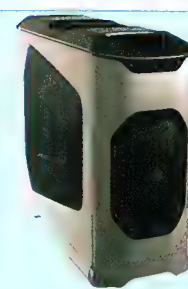
Cooler Master Stacker 830
PRICE $335

Like the Stacker before it, this sensational Stacker stacks sumptuous specifications salaciously.

Reviewed in Issue 61 – Page 36

Asetek Vapochill Lightspeed
PRICE $1129

Vapour phase change. Ooooh. Vapour. Phase. Change. No matter how many times you say it, it's still cool (pun!)

Reviewed in Issue 64 – Page 38

Western Digital Raptor WD1500ADFD
PRICE $460x2

Dear lord. The performance king hath cometh, short of whacking in a SCSI. Buy two and RAID 'em.

Reviewed in Issue 62 – Page 40

Dell 3007 WFP
PRICE $2899

Thirty inches. 2560x1600. 11ms G2G. If you can handle the size and cost to run this massive beauty, you won't be disappointed.

Reviewed in Issue 61 – Page 49
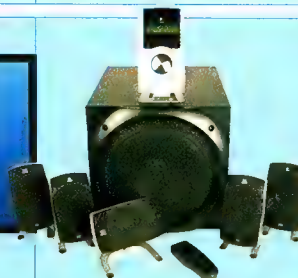
Logitech Z-5500D
PRICE $600

Able to play the 'liquid gold' that is DTS 96KHz/24-bit, this 5.1 beast can wreck both home and hearing alike with equal impunity.

Reviewed in Issue 48 – Page 56

Lian-Li PC-S80
PRICE $499

The PC-S80 must have been designed by an earmuff wearing design dude as it not only looks sleek and cools well, but it's super quiet to boot.

Reviewed in Issue 66 – Page 41

BIOS Version
5 71 22 24 08

MEET THE QUAD SQUAD

◀ •

With two 7950GX2s in one hand and a crazy set of benchmarks in the other, **Craig Simms** sets out to discover the potential of quad SLI.

W e remember quite vividly when the words 'quad SLI' were first uttered – we felt our collective arses hit the floor as we fell over in shock, foolishly never expecting it to go beyond its current dual configuration.

That was in reference to Gigabyte's Quad Royal motherboard, a white elephant with four PCI-E x8 slots that never received the drivers it needed to make the four NVIDIA graphics cards act as one. Maybe it got NVIDIA thinking, maybe it was already on the cards, but fast forward a few months and suddenly quad SLI was happening for real, in dual PCB per card form, and of all things, in a Dell. The world had turned on its head.

Initially it was just a technical demo. Then before we knew it had become reality, although the only way you could get your hands on such a setup was OEM style through pre-built box vendors such as Dell, Voodoo PC and Alienware. And definitely not in Australia.

Rumours started spreading that performance wasn't as good as dual card solutions except at ridiculously high resolutions, due to CPU limitations and the overhead required to coordinate four GPUs. Suddenly it didn't matter so much that DIYers couldn't get their hands on them. We'd shell out a lot for hot hardware, but bogus hardware would get none of our hard-earned dosh. It became very much an attempt to steal the thunder away from ATI's new king of the hill, the X1900XTX, and nothing more. We attempted to get some in, but no one seemed to be willing. Even NVIDIA appeared to be somewhat embarrassed, quietly and sadly repeating the words 'quad SLI' to itself, hoping people would be caught up in the bravura of it all while making sure very little of the world got to see it, let alone benchmark it.

A few months of accepting we'd never get to see such a setup, and suddenly a pair of 7900GX2s complete in system turned up. Two days later their successor, the 7950GX2s arrived as well. What now? NVIDIA was going retail. It was serious about quad. We leapt for joy.

The 7950GX2 is clocked slower than the 7900GX2, but has several advantages – a little bit of rejigging on NVIDIA's part has resulted in a much shorter, much cooler-running, single power connector, single SLI bridge card, which only runs a little slower than the original. When you consider the immense size and heat output of the former, this is a welcome sacrifice.

We pulled everything out, throwing anti-static bags around in joy, preparing for the quad experience – only to find out that we were never meant to get two 7950s – and that NVIDIA was still pulling its lack-of-support-for-quad-SLI shenanigans. As if to make up for it, a pair of ASUS 7950GX2s turned up. Then some Albatrons. Then a Gigabyte. Inno3D and Xpertvision offers were made. The floodgates had opened. This was no paper launch.

REALITY CHECK

But still no quad? It seems the drivers aren't quite ready yet, with the results differing for what seems like pretty much everyone, and NVIDIA cautioning that if you want to try it, best results are seen at stupidly high

resolutions like 2560 x 1600, or if you enable something no other card can possibly do, like 32x antialiasing.

Part of this comes to drivers, part of it also may come down to hardware compatibility – as of writing, most motherboards need a BIOS update in order to understand NVIDIA's custom 48 lane PCI-E 'switch', the chip/bridge that sits between the video card PCBs and allows them to communicate as if they were independently sitting on the PCI-E bus. Check out www.nvidia.com/GX2 for the compatibility list.

In fact at this stage, the 7950GX2 in quad SLI is being treated pretty much as the 7900GX2 was – to be used in select pre-built machines only. The public driver certainly allows quad SLI to be turned on, but NVIDIA won't support it among the DIY public just yet. Hopefully we'll see a driver update soon that will turn this around, as well as the performance scores.

But we're getting ahead of ourselves. Let's look into the architecture of these decidedly beige elephants.

HARD WEAR

The 7950GX2 features two PCBs with a G71 90nm GPU, 512MB of 256-bit GDDR3 memory and 24 pixel processors each, giving an effective 1GB of video memory and 48 pixel processors total. A pair of dual-link DVI ports and a TV-out port line the dual slot backplane. The table below outlines the specs as compared to other top end cards.

	7950GX2	7900GTX	X1900XT
Core clock (3D)	500MHz	650MHz	625MHz
Memory clock (3D)	1200MHz	1600MHz	1450MHz
Vertex processors	8 per PCB	8	8
Pixel processors	24 per PCB	24	48
ROPs (Raster operations)	16 per PCB	16	16
Memory	512MB per PCB	512MB	512MB
Transistors	278M per PCB	278M	384M

Busting the heatsink and fan off both PCBs reveals an additional chip on the bottom card, the aforementioned PCI-E switch that lets the board do its magic. While the bottom card features the PCI-E fingerboard, the top card is attached to the DVI ports – interesting, as the 7900GX2 had both the fingerboard and the DVI ports on the bottom card. The RAM chips forgo the recent arch shape found on both ATI and NVIDIA high-end boards these days, to become a single right angle, the total on both cards reaching a beefy 1GB. The day has finally come.

The thickness of the card is about that of a 7900GTX or X1900XTX,
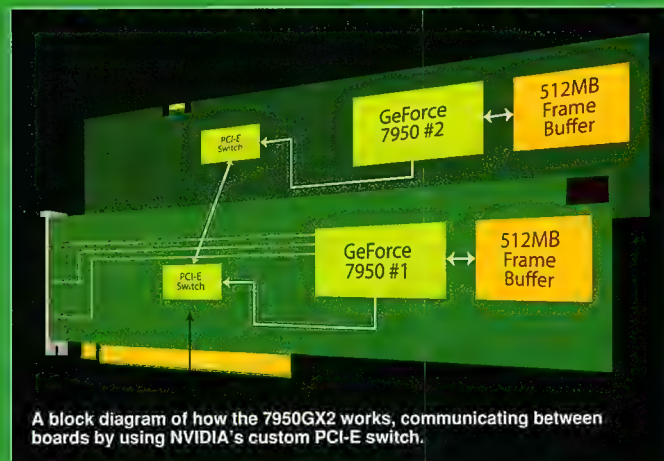
and with two 7950s stuck into a board, once again the point is hammered home that the motherboard as we know it needs a significant redesign as the graphics cards swallow up the space. If things don't improve on the minimisation front soon, we can see graphics cards sitting parallel with the motherboard before long.

The 7900GX2 is by no means the first dual GPU graphics card (Gigabyte and ASUS have thrown out a few NVIDIA based boards now, not to mention a few ATI attempts), but it is the first one that is likely to see widespread success due to it being invoked and supported by the muscle of NVIDIA. Add to that the public's growing acceptance and awareness of multiple processors thanks to multi-core CPUs and of course SLI/Crossfire, and it's likely we'll see this architecture continue into the future. NVIDIA is adamant that full driver support for quad SLI is coming, so we wait with our customary baited breath.

Recommend is at least a 400W PSU for a single card, but as we advocated the use of 400W way back in the days of the Athlon XP, it can't hurt to have something a little more beefy. NVIDIA claims the 7950GX2 draws 143W at peak, so if you're going the full hog and, despite the current performance deficit want two cards, equip your PC with at least 600W of power.

The GX2s are also the first cards we've received that have full support for HDCP, key ROM and all – so now at last you can be excitingly hobbled in order to watch high definition content that doesn't exist yet. Yay! It doesn't hurt of course to be prepared.

Finally, there's one more obvious advantage to owning a GX2 – you don't need an SLI enabled motherboard to essentially experience SLI (even though it technically is not). Whether your motherboard chipset is ATI, Intel or otherwise, a single GX2 will work with both GPUs just fine.

RENDER ME UNCONSCIOUS

More GPUs means that more SLI rendering modes need to be enabled, and to that end, on top of slightly modified AFR (Alternate Frame Rendering) and SFR (Split Frame Rendering) modes to handle the increased number of GPUs, we have the brand-spanking-new 'AFR of SFR'.

In AFR, GPU 1 renders the first frame, GPU 2 the second, GPU 3 the third, and GPU 4 the fourth, essentially acting like a read ahead, load balancing nicely. SFR, works by literally splitting the frame's work load among the available GPUs, but although exceptions exist, generally isn't as fast as AFR.
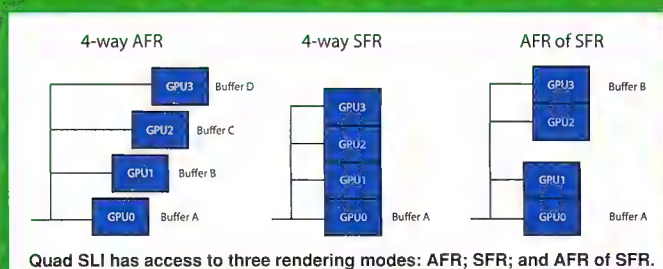
The new method, AFR of SFR, combines these two methods, setting the first 7950GX2 on a frame in SFR mode, while assigning the second GX2 the next frame to calculate in SFR mode.

Finally, of course, a single GPU on the 7950 will render the scene just fine by its lonesome and both GPUs need not be active.

TESTING

We installed NVIDIA's 91.31 beta drivers and put the card through its paces in both single and SLI modes. We also benched a 7900GTX and X1900XT in dual card mode for comparison. NVIDIA suggested we needed to use resolutions of 1600 x 1200 and above with 4xAA and 16xAF to see the 'power' of the 7950GX2, however we decided to cover a slightly broader gamut.

A single card can either have both GPUs running together to drive a single display, or separately to handle multiple screens. For the purpose

A block diagram of how the 7950GX2 works, communicating between boards by using NVIDIA's custom PCI-E switch.

Quad SLI has access to three rendering modes: AFR; SFR; and AFR of SFR.

of these tests, we used both GPUs on a single display, with the multi-GPU rendering mode set to 'Auto'.
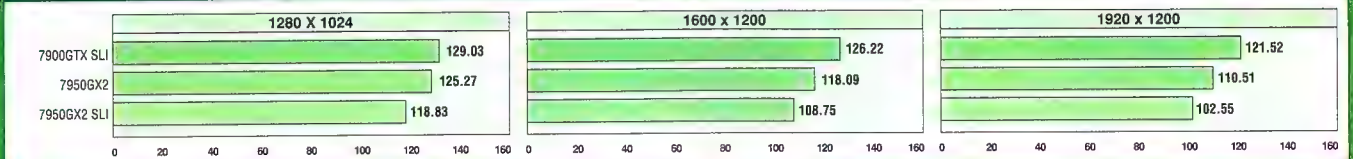
The first impression is that even though there's only a weedy fan on each PCB's heatsink, the 7950GX2 is very quiet. It's also reasonably warm (63°C idle, 72°C load) – although we didn't experience a heat-related lock up once, so it is obviously operating within tolerances. Nonetheless, this may be an interesting beast to overclock due to said heat. Unlike other graphics cards where the fan starts at full throttle and then powers down quickly upon boot, the GX2s surge up and down a few times before the screen comes on. Not annoying, just different.

SOFTWARE

We've bitched about the new 90 ForceWare before – the control panel isn't very usable until you turn on the advanced options and classic navigation pane, and even then it just feels wrong to use. A new 'related tasks' pane appears down the left in Windows XP style, and is just as useless.

This is an area in which NVIDIA had a clear advantage due to ATI's insistence on using their Catalyst Control Centre – we now consider them as bad as each other. Way to shoot yourself in the foot. Still, none of the repeated complaints from just about everyone have steered ATI off the

Half Life 2

	1280 X 1024	1600 x 1200	1920 x 1200
7900GTX SLI	129.03	126.22	121.52
7950GX2	125.27	118.09	110.51
7950GX2 SLI	118.83	108.75	102.55

X3: The Reunion

	1280 X 1024	1600 x 1200	1920 x 1200
7900GTX SLI	59.11	58.97	58.31
7950GX2	59.8	56.47	56.46
7950GX2 SLI	57.83	57.3	56.54

Splinter Cell: Chaos Theory

	1280 X 1024	1600 x 1200	1920 x 1200
7900GTX SLI	137.56	107.59	93.52
7950GX2	109.77	84.42	73.08
7950GX2 SLI	108.54	83.5	72.26

Call of Duty 2

	1280 X 1024	1600 x 1200	1920 x 1200
7900GTX SLI	44.93	44.29	43.16
7950GX2	41.93	35.07	32.27
7950GX2 SLI	43.21	38.97	34.7

3DMark05

1280 X 1024		1600 x 1200		1920 x 1200	
7900GTX SLI	12533		11632		10968
7950GX2	10646		9252		8458
7950GX2 SLI	11151		10087		9255

3DMark06 SM2.0

1280 X 1024		1600 x 1200		1920 x 1200	
7900GTX SLI	3702		3126		2812
7950GX2	2793		2321		2088
7950GX2 SLI	3265		2659		2500

3DMark06 SM3.0

1280 X 1024		1600 x 1200		1920 x 1200	
7900GTX SLI	4147		3593		3234
7950GX2	3197		2612		2328
7950GX2 SLI	3524		3113		2805

path, so we're guessing we'll be similarly stuck with NVIDIA's new look for quite a while. If you're not convinced, NVIDIA has stated that the new look is in tune with Microsoft's upcoming operating system, Vista, and is one of the primary reasons for the change.

RESULTS

As you can see within our benchmark suite, nothing massively benefited from the quad setup, although the 7900GX2 does quite well by itself. 3DMark05 and 06 increased their scores, but not to a degree that is enticing. Despite our best efforts we were unable to secure a Dell 3007FPW in time to test 2560 x 1600 resolutions, so we resorted to our local Labs' 2405, which is still capable of the respectable resolution of 1920 x 1200.

Shortly after we got the results above, Windows started blue screening, claiming our A8N32-SLI Deluxe with the updated BIOS wasn't ACPI

> "Fortunately there was one safeguard... NVIDIA's own quad demo lovechild, FEAR."

compatible. Subsequent Windows reinstalls resulted in the same effect, once we'd installed the graphics drivers. We pulled out our second, non-updated A8N32-SLI Deluxe and ended up with the same result – it seems there's some work to be done on both the hardware and software side yet.

Pulling out the nForce 590-based ASUS M2N32 SLI Deluxe and FX-62, we found our problems vanished – except with Quake 4, which despite endless configurations and tests refused to provide reliable benchmarks.

Fortunately there was always one safeguard – NVIDIA's own quad demo lovechild, FEAR.

At 1920 x 1200, a single GX2 averaged 63fps on the Interval 02 – Initiation level, with everything set to maximum and soft shadows on. Throwing in a second lifted this to a crazy 104.42fps – while the minimums sadly weren't affected (19 and 18fps respectively), the maximums certainly helped out the average here (143 and 249fps respectively). Dropping to 1600 x 1200 raised our averages on both

▲ After installing the second card and drivers then restarting, you get this lovely little option. Your heart truly skips a beat. Shame about the rest of the control panel.

▲ FEAR is one of the few games that shows substantial increases with quad SLI.

single and dual setups by 10 frames. The 7900GTXs in SLI, by comparison, managed 94.39fps average at 1600 x 1200, and started straining a little at 1920, giving us 77.41fps.

This in itself proves that quad SLI can be beneficial, massively so in fact – but whether or not more games will take advantage of this, either from the get-go or via driver updates, remains to be seen. We are cautiously hopeful.

OVERCLOCKING

Enabling Coolbits, after a bit of fiddling we managed to get the 7950s in SLI running at 579MHz core/800MHz mem before NVIDIA's control panel complained, with 3DMark happily looping with no artefacts at this frequency – leaving us to wonder if these babies could hit GTX core speeds with a little more cooling incentive, or if the control panel had been a little more lax. Not ones to be discouraged, Powerstrip was dragged out of hiding to push this further to 607MHz core, any more of which started causing artefacts – the memory slider was already as far as it could go. After a while the cards overheated, slowing down 3DMark – meaning the sweet spot was somewhere between 79 and 107MHz over the default, which isn't too shabby at all.

CLOSING

As something that nicely pips a single 7900GTX, not to mention the X1900XTX, by a few hundred dollars, the 7950GX2 is a tasty little beastie and now happily sits atop the pile – although it is a very expensive pile. Mind you, NVIDIA has managed to release a two GPU card for the price of a single GPU high end card, an impressive feat which will no doubt whet the appetite of enthusiastic early adopters.

For the rest of the sane people who like keeping their money, we recommend you hold off a little longer until quad SLI is pimping at a diamonds and purple top hat rate... with a shiny diamond topped cane. By that time the price should have dropped and it will make it so much more delectable.

Or maybe, just maybe, the pile that it sits on will be the one of white elephants, that will be handily discarded when the next single core architecture comes out and blows it away.

With support directly available in ForceWare and with ATI reportedly working on a dual GPU card to combat it, things are looking good. As always, we'll take the role of the observer, and see what happens when it eventuates.

atomic

TECHNIQUE
HANDS-ON TUTORIALS, TIPS, AND TWEAKING FOR THE TECHNICALLY INCLINED.

TECHNIQUE CONTENTS

Welcome to your new desktop. It only takes two seconds to get to the login screen.

You put in your username and password and hit enter. A dialog pops up, asking you if by hitting enter you want it to activate the 'OK' button. You click OK.

The desktop loads, but only after you clear all of the modules one by one through the security panel. Strangely, you never remember giving the OS permission to access advertising servers to show ads on the desktop, or throughout applications. Your every movement is tracked and uploaded to the same marketing server, so they can deliver ads more effectively.

The OS knows the lifespans of all the products attached to it, so when you've moved your mouse beyond a certain distance you're suddenly hit with ads for replacement mice. You can't proceed until you select one, so you do, and it's mailed to your home address which is embedded in your unique identifier.

You fire up a Web browser which force installs the latest update, quoting 97 security fixes. While the application restarts, a dozen new security warnings pop up saying that something is trying to overwrite a critical part of the operating system. It reloads. You're pretty sure that there wasn't an 'advertising bar' last time, but that wasn't included in the changelog.

Two minutes later you're online, and your credit card has been hit so that you can access your email on a guaranteed tier one Net connection.

You read an email from your mum, with several highlighted keywords which automatically pop up descriptions and small videos linked to associated Web stores. It doesn't require a mouse-over to activate, it just does it. Your dad long ago gave up even trying to send email due to all the hurdles, and has joined the burgeoning amount of people simply sending things by snail mail again.

You shut down the browser after confirming that that's what you really wanted to do, eject the driver disc after it has been scanned to make sure nothing has been tampered with, and shutdown the computer after it's checked with a central server that critical operating system files are exactly as they should be.

As it powers down you wish you could install a free operating system, but that was made illegal through the Fair Trading Act in 2015. Besides, the hardware would rat you out if you even tried.

You go outside, wondering if all this technology is really worth it, yearning for the good old days when it actually assisted you.

But geez, you think, it sure does boot fast.

Craig went insane and shot the sheriff.

atomic

PATCH

tinytweaks

WGAH!

So you've been hit by the utterly offensive Windows Genuine Advantage tool, and wish to get rid of it, short of reinstalling Windows or winding back the clock with System Restore.

Well a way to partially undo the damage has been created -- RemoveWGA stops WGA from checking if you have a geniune copy of Windows after it has already done it once, also effectively blocking the phone home functionality that talks to Microsoft on an alarmingly frequent basis. You can find the tool here: **www.firewallleaktester. com/removewga.htm**

Watercooling rescue

So, what are the emergency procedures when you have coolant running all over your expensive PC bits? Well, the first step is to make sure the power cord is disconnected from the wall plug.

The next step is to mop-up all of the coolant with something absorbent, and then 'dab' dry all of the PCBs, starting at the top and working toward the bottom. In a major deluge, it is wise to pull out all of the expansion boards, the CPU, RAM and all other power connectors. Using an aerosol circuit board cleaner, such as Servisol from Jaycar, flood spray all of the pin connectors in the Ziff, RAM and expansion sockets, ATX/power connectors and PATA/SATA plugs. The idea is to displace any trapped coolant and wash it right off of the board. Once clean, allow all of the components to air dry, and then inspect them for any residue that might remain. Re-assemble, hit the power button, and pray.

World of alternative

One nice feature of Debian and Ubuntu systems is the alternatives system, which allows the user to select default tools for various tasks, including the default text editor, Web browser, terminal emulator, or C compiler. The /etc/alternatives folder contains symlinks for each of these, linking the virtual tool with the preferred implementation. To reconfigure an alternative, use update-alternatives – for instance, 'sudo update-alternatives --config editor' will display a list of editors and allow you to select a new default.

MODLIGHT
Zombie Master
Half-Life 2 mod
www.zombiemaster.org
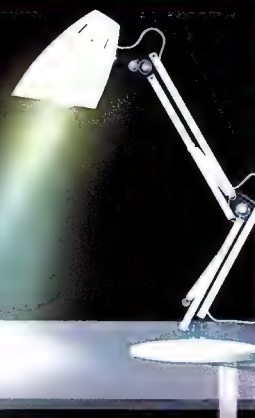
What is it with Half-Life 2 and zombie mods? There's No More Room in Hell (**www.nomore roominhell.com**), which has been in development for so long with no release that the zombies themselves are starting to die (again); Zombie Panic: Source (**www.zombiepanic.org**), an upgrade of the original and popular Half-Life 1 mod of the same name; and finally Zombie Master (**www. zombiemaster.org**), a mod that, while it looks like a generic zombie-shooting affair, has a number of new features that will make it, in our opinion, the best of the lot.

Unfortunately the darn thing isn't out yet. It's been in development since November last year and so far all that you can grab from the website are a bunch of screenshots, and they're not the most impressive shots sadly.

Luckily for us, the site's FAQ is more than loaded with juicy details. Inside this link you'll discover that Zombie Master is indeed about zombies – except instead of having multiple players control all the wandering dead, it's just one and they get to direct them via an RTS-style interface. The survivors on the other hand are individually controlled, and must complete a certain objective (such as finding parts to get a vehicle working again) in order to win.

At the onset of each round, a random player is chosen to control the horde. This player must then manage resources (we're not sure what sort at this time) and produce zombies, set up ambushes and prevent the survivors from escaping. As you would expect in an RTS, the controller (or zombie master) can summon different types of zombies from your run of the mill shamblers to the fast and deadly. Killing a human player nets the zombie master a resource bonus to fuel his ongoing brain-eating efforts.

There's no release date as yet, but keep your eye on Zombie Master. It sounds delicious.

patch of the month updates that matter

Galactic Civilizations II 1.2 Patch

New to version 1.2 is a bunch of new randomisation options for opponents and enhanced AI; a fleet management screen; better mod support; better ship designer and numerous performance and UI tweaks. Note that this patch has been out since June, but we know that not everyone remembers to run Stardock's autoupdate program and may have missed out on this great patch. So now would be a good time to get it, because you're really missing out.

antisearch things you should never type into Google Image Search

Michael Jordan? Shaq maybe? Sadly, typing basketball into Google turns neither up as the first result. Instead, you'll get to feast on the utter greatness of midget basketball. Yes, midgets with basketballs.

Google™

'basketball'

quote of the month learn from the masters

'SCSI is *NOT* magic. There are *fundamental technical reasons* why it is necessary to sacrifice a young goat to your SCSI chain now and then.'

— John Woods

distrowatch where it's at in the world of Tux

Distribution	Stable	Beta	Website
Ubuntu	6.06	None	www.ubuntulinux.org
Debian	3.1r2	sid	www.debian.org
SuSE	10.1	10.2alpha1	www.opensuse.org
Fedora Core	5.0	6.0test1	fedora.redhat.com
Mandriva	2006	2007alpha	www.new.mandriva.com
Gentoo	2006.0	2006.1	www.gentoo.org
Knoppix	5.0.1	None	www.knoppix.com

powertools

RapGet
www.rapget.com
RapGet helps you get files from rapidshare.de megaupload.com, and 63 other such sites. Simply add a supported link, and it will auto queue and download when the file is ready, rather than you having to leave the website open to wait in a queue. Combined with TOR, it's a handy way to get around stupid restrictions.

Google Earth
earth.google.com
It's taken a while, but the Linux port of Google Earth is finally here. It's a beta of version 4, with a few rough edges, but it should be up there with the Windows version soon.

LMNO
www.lmnoeng.com
LMNO Engineering, Research, and Software, Ltd. is an interesting site full of calculators if you really want to understand the physics of your watercooling system, or have a penchant for lots of buttons with numbers on them.

Atomic v2.5 -

SITES OF THE MONTH

http://www.microsoft.com/ betaexperience/default.aspx
Go on. Get in on the latest betas from Microsoft, including Vista and Office 2007. All you have to do is register and you're away with the newest software, experiencing the joy long before it's released. And for the cynical among you, yes, that means the crashes too.

appdb.winehq.org
When you need to run the odd Windows app, Wine can be a great option, offering support for several of Bill's finest applications. The AppDB lists status reports for thousands of tools, along with any tweaks required to get them working.

www.virtual-hideout.net
Virtual-Hideout Cool Case Gallery – 1263 modded cases in one database, dating from February 11 2002 to the present day. Think that you have an original idea, or simply stuck for inspiration? Spend a few hours here!
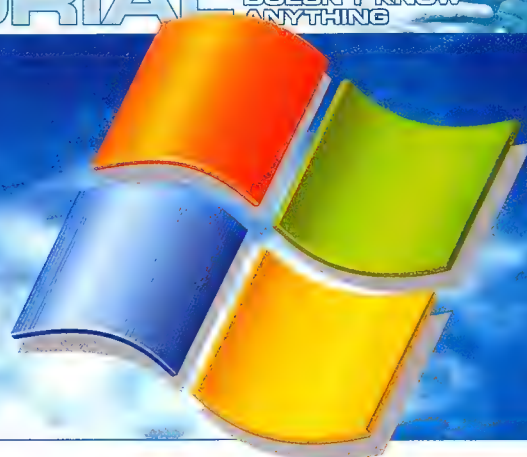
BILL GATES DOESN'T KNOW ANYTHING

Operation 'Lock Down'

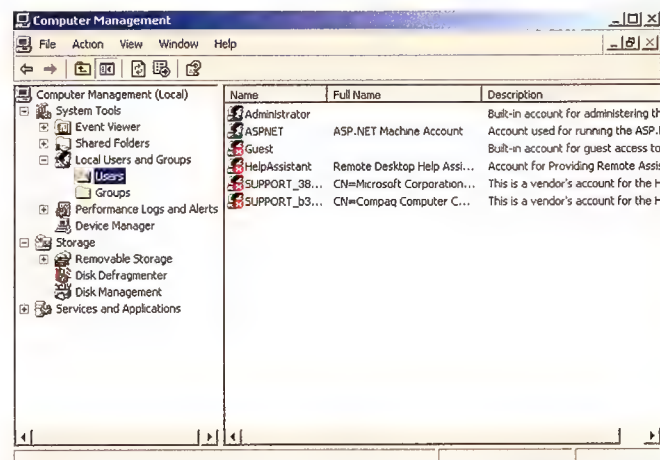## Craig Simms shows how to keep casual users in check

You've all been there: a family member or friend has destroyed your PC by somehow stumbling randomly on the exact key combination required to format all your hard drives and sacrifice your modem to Sol Trujillo. Don't you wish you could lock down areas of your PC so people can't be a threat any more?

Users and groups

This amazing feat is actually pretty darn easy, so let's start from the top. Make sure you're signed into an administrator account and go to Start > Control Panel > Administrative Tools > Computer Management. Go to Local Users and Groups > Users and right click in the right hand pane, and select New User. Enter the details as required – for the purposes of this tutorial we'll call the account 'test'. Click Close when done, then right click on the new account and choose Properties. Go to the Member Of tab – note that the 'Users' group is already there – this will allow the account write access to its own folders under Documents and Settings, but only read access for the rest of the drive. It will also block the account from accessing other accounts. You may want to create a new group for extra access. To do so, close the member properties, and select Groups back in Computer Management. Right click in the right hand pane and choose New Group, and enter the name as 'tests'. Note that you can't create a group with the same name as a user, which is why we didn't name it 'test'.

Go back to the test user profile and add it to the group 'tests' by going to the Properties > Members Of tab, hitting the Add button, the Advanced button, the Find Now button, selecting the tests account and hitting OK.
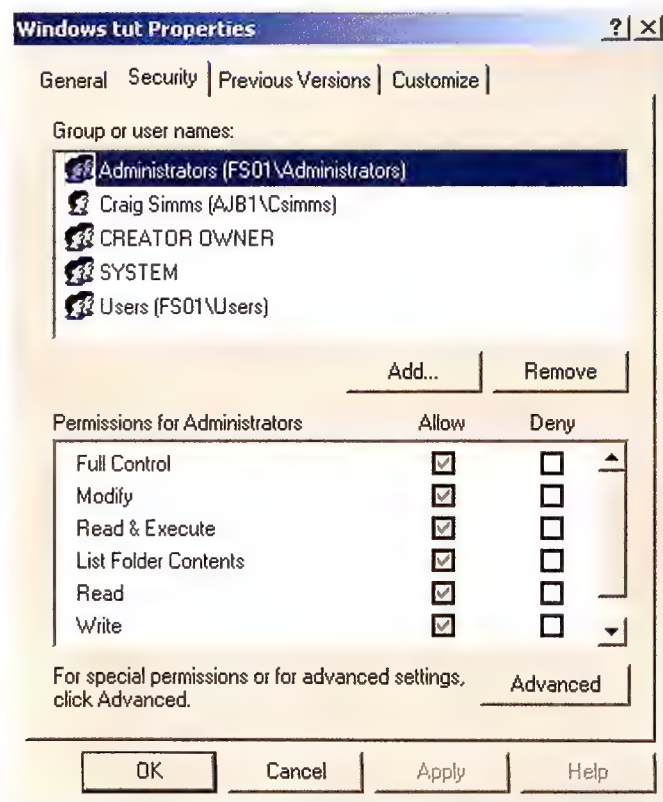
Log out of your administrator profile, and into the test profile so all the associated files can be created. Once it's finished, log back into your administrator account.

Access denied

Now we can lock the user out, or grant them access to folders. To do so, we need to first turn off Simple File Sharing. Open up Explorer, then go to Tools > Folder Options and then the View tab. Turn off Simple File Sharing (at the bottom of the list) and hit OK.

Now find a folder in Explorer, right click on it and select Properties, then Security. Add the tests group by using the same technique you used to attach the test profile to it. Make sure the tests group is selected then set the permissions below. Note that if a member belongs to multiple groups and there is a permission clash, 'deny' overrides 'allow'. You can also lock out individual files in the same way if need be, so you can still give access to the rest of the contents in a folder.

▲ The Computer Management console gives you many more options for manipulating user profiles than the standard 'User Accounts' control panel.


▲ Fiddling with folder security is good for your health, and keeps your files safe and warm at night.

If you have a lot of folders to lock the account out of, you may prefer to remove the profile from the 'Users' group and manually give access to their Documents and Settings folders through the tests group, to save time.

Flexibility

You've no doubt spent some time in Administrative Tools in the Control Panel, but most likely only to restart or stop services. There's also a lot of other powerful stuff in there that you may have had contact with, but it's scattered all over the place. To make things more convenient, let's create our own Microsoft Management Console (MMC).

Go to Start > Run, type 'mmc' and hit enter. You now have a blank window to add your own components to. Go to File > Add/Remove Snap-In and click the Add button. Select the components you want to appear in the window (and in some cases, whether you wish to control the current PC or another PC). When you're done, go to File > Options, and give the console a proper name. Go to File > Save As, browse to a folder off your start menu as to where you want the console to appear, enter a filename and hit OK. Custom console fun!
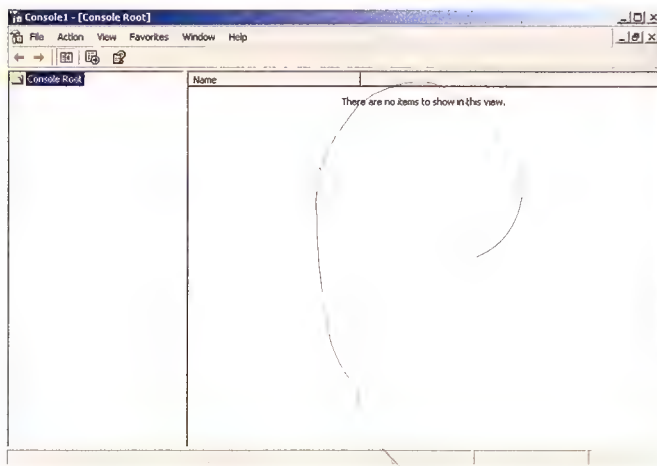
▲ MMC is a framework for a whole range of management snap-ins.

Group Policy Editor

Although a little hobbled if you're not connecting to an active domain, the Group Policy Editor still has plenty of options for a local machine, particularly if you have multiple accounts and wish to lock down some of them. There are more options in here than we'll ever be able to cover (and a lot of them you may have accessed previously through the Registry), so our best suggestion is to simply explore the options, and read the explanations that appear down the left when you click on them if you're not sure.

Log off your administrator account and into your test account, browse to C:\Windows\System32, right click on gpedit.msc and choose 'Run As'. Select 'The following user' radio button, enter your Administrator account and password – this way you can access restricted executables through a restricted account. If you've already locked down the Windows folder, never fear – open up a command prompt window (or the run dialog) and type **runas /user:LOCALMACHINE\ ADMINISTRATOR "mmc c:\ windows\system32\gpedit.msc"**, replacing LOCALMACHINE with the name of your computer and ADMINISTRATOR with the name of your administrator account. You could also run your custom console if you wish. You should then be prompted for a password and the application should run if the password is entered successfully. Alternatively of course, you could execute Explorer as an administrator instead for complete folder access.

Removing Control Panel items

Once you have GPEdit open, head to User Configuration > Administrative Templates > Control Panel and double click on 'Hide specified Control
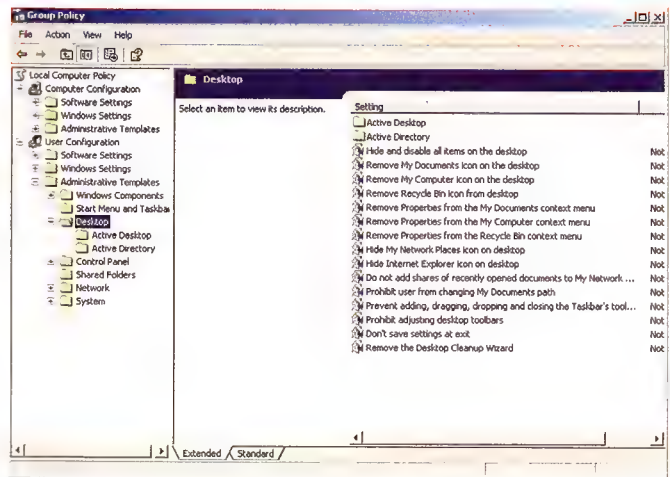
▲ The Group Policy Editor – this is where the meat and cheese of your lock downs will be performed.

Panel applets'. Select the 'Enabled' radio button, and click on 'Show'. Next open Explorer and do a search on your system drive for *.CPL. These CPL files are the shortcuts in your Control Panel – some with completely unintuitive names. To find out what they are, simply double click on a .CPL. If you don't want that control turning up in Control Panel, head back to the Group Policy editor, click the 'Add' button and insert the name of the file. Click OK twice when done – note that you may need to refresh the Control Panel (simply right click and select 'Sort by name') in order to see the changes.

Alternatively, if you have more to hide than show, simply use the 'Show only specified Control Panel applets' option instead, or simply disable access to the Control Panel and it's included applications altogether by enabling 'Prohibit access to the Control Panel'.

Adding Control Panel items

To add Control Panel shortcuts, you need a program called YourCPL, which can be found at **www.iansharpe.com/getfile. php?dl=yourcpl**. After extracting the ZIP, drop YourCPL.cpl and YourCPLconfig.txt into your Windows\System32 directory, then open the .TXT file. Search for the word 'Regedit', then replace this line with the path and executable that you wish to appear in Control Panel, in the format **[path]<tab>[Control Panel Name]<tab>[Tooltip Description]**. Unfortunately at this stage you can't choose the icon, so hopefully your executable comes packed with one. You can add multiple Control Panel items simply by adding another path and executable to the line below.

You may get errors while doing so – in which case this can sometimes be fixed simply by moving the YourCPL files out of the System32 directory, refreshing the Control Panel, then dropping them back in. Alternatively a refresh may simply do the job, or at worst, a restart.
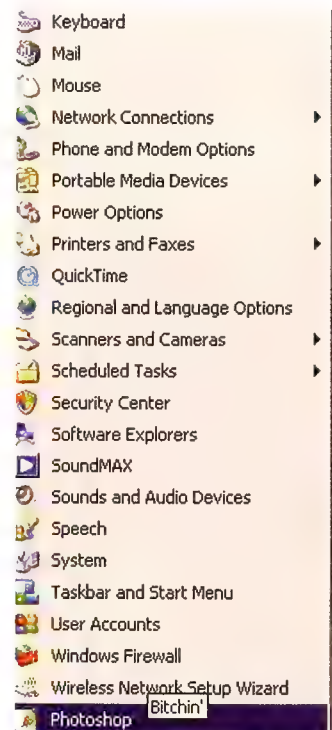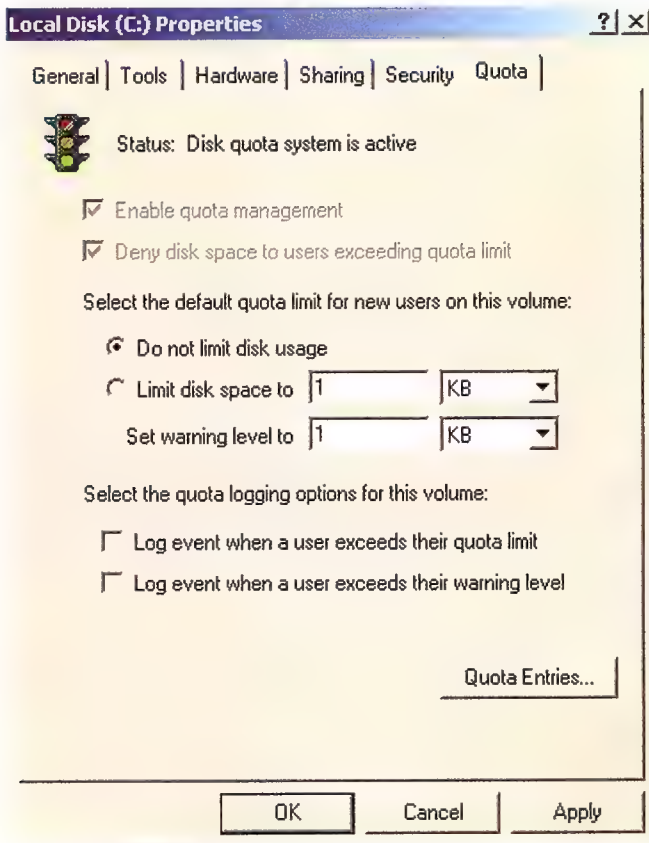

▲ YourCPL allows you to add whatever you want to the Control Panel. Which is nice.

Disk quotas

Okay, let's stop this test account using more disk space than we want it to (assuming you have an NTFS drive). In GPEdit, go to Computer Configuration > Administrative Templates > System > Disk Quotas and set 'Enable disk quotas' and 'Enforce disk quotas' to enabled. You can set a default quota and warning limit if you want, and write event logs as well if need be, but it's unlikely in a home situation that you'll need this kind of monitoring. Go to Group Policy and enable 'Disk quota policy processing'. Log out of the test account and into your administrator account.

Right click a hard drive in Explorer, choose Properties and go to the Quota tab, then click Quota Entries. Double click on the test account, set the 'Limit disk space' radio button and set the disk space and warning level values accordingly. Now when the test account logs in, Explorer will not only enforce that quota, but will report to the user that the hard disk in question is only that size.

▲ Oh yeah, restrict that disk, baby. Yeah, right there. Just like that. Oooh.

Denying and allowing programs

Remember how earlier we set permissions on files and folders? You can also specifically target executables through the Group Policy Editor by browsing to User Configuration > Administrative Templates > System and playing with 'Run only allowed Windows applications' or 'Don't run specified Windows applications' components.

Login scripts

Log back into your test account and get into GPEdit again. We're going to run something whenever the specified user logs in. While this is usually helpful within a domain (loading virus scanners, mapping network drives, etc), it will also happily run batch files, which means you can execute programs, map network drives or do anything else that's possible from the command line. Just make sure that the batch file is accessible by the user,

or it won't run. You can also run logoff scripts if you so wish – check out way back in *Atomic 50* for a rundown on command prompt bashing. Either way, you can add these scripts by going to User Configuration > Windows Settings > Scripts (Logon/Logoff). You can also execute programs at logon by going to User Configuration > Administrative Templates > System > Logon and enabling the 'Run these programs at user logon' option.
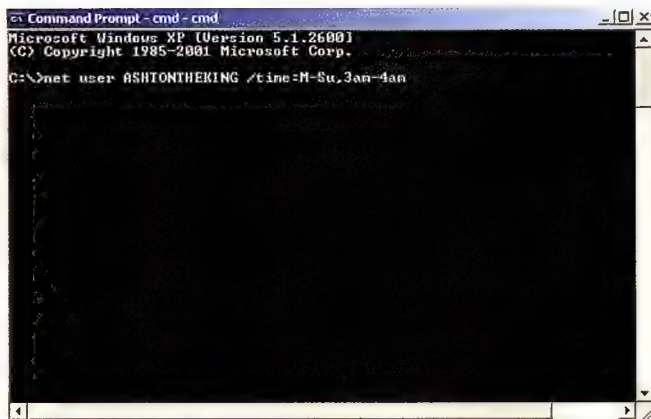
Stop the installer

A lot of programs flat out won't install anyway if you don't have administrator privileges, but let's also stop the Microsoft installer running from removable media such as CDs or USB sticks. Head to User Configuration > Administrative Templates > Windows Components > Windows Installer and enable 'Prevent removable media source for any install'.

Uber nastiness

If you want to be particularly despotic, you can actually restrict the hours between which someone can log on. Open up a command window in your administrator account, and type `net user USERNAME /time:M,7am-5pm;T-Sa,12pm-1pm`, replacing USERNAME with the appropriate username, of course. This will only allow the user to log on between the hours of 7am and 5pm on Monday, and between 12pm and 1pm on Tuesday through to Saturday. You can replace anything after the /time: argument with 'all' to give full access. Days of the week are represented by M, T, W, Th, F, Sa, Su. Time is unfortunately limited to one hour increments.

Note that this won't force-log off someone when their allotted time period is up – to achieve this you might need to enforce a password re-entry on your screensaver, then force the screensaver on and remove access.

▲ Being particularly harsh to a certain account holder. Late nights for this one.

Closing down

There are, of course, an utter buttload of other options within the Group Policy Editor, so we'll leave you to don your helmet and jungle gear to explore on your own – needless to say you can lock down almost anything you desire – or even customise your own Windows profile to remove some of the more annoying bits, like Autorun.

There are a number of other ways to lock your system down, but unfortunately they either require paid-for programs, or for you to be of a domain in order to use them.

Regardless, you should now be able to restrict the other user profiles on your PC to a level that your comfortable with, short of setting up a clapped out old Linux box for general use with Web browsing access and OpenOffice only, relying on its non-familiar nature to stop people from screwing up.

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LINUX TUTORIAL

The Uber Linux Box Challenge Part 3

Leigh Dyer once again delves into the intricate art of uber box making.

Now that your uber box is up and running in place of that boring old router, it's time to start going beyond routing and set up the applications that will put the 'uber' in your uber box. We shouldn't get too far ahead of ourselves though – the firewall we set up last month still needs a little uberfication.

Great walls of fire!

Right now, you could say our firewall is perfect: while all outgoing traffic is allowed, as is any return traffic coming in, any attempt to initiate an incoming connection from the Internet will fail. That's fine for some cases, but it's not ideal for our uber box, where we want to allow external access to selected services, as well as forwarding ports through to applications on machines inside the LAN. To do all this, we need to punch a few strategic holes in that impenetrable facade.

Allowing external access to services on the uber box itself takes just a single 'iptables' command, which you can add to the firewall script you installed last month. The following rule allows incoming SSH connections:

```
iptables -A INPUT -i $WAN_IF -p tcp --dport 22 -j
ACCEPT
```

Reading across the rule, it should hopefully make sense: we're allowing incoming packets from the Internet connection to the local machine on port 22, which is the standard SSH port. For common services, including SSH, you can use names instead of numbers to specify the port. The complete list of port name aliases, and the ports they map to, is in the '/etc/services' file.

To add rules for other services, copy this rule and change the port (or port alias). You can also change the 'tcp' protocol to 'udp' for services that run on UDP. Once you've added the command to the firewall script, preferably just above the NAT rule at the end, the script needs to be run again to activate the new rules. This will happen automatically when you next reconnect, but you can also do it manually to make the changes immediately:

```
sudo /etc/ppp/ip-up.d/firewall
```

Port forwarding is almost as easy. To perform the actual port forwarding we use a NAT rule, while a rule similar to the above but on the FORWARD chain allows the connections through. These rules forward connections on port 7881 through to 192.168.1.21:

```
iptables -A FORWARD -i $WAN_IF -p tcp -d
192.168.1.21 --dport 7881 -j ACCEPT
iptables -t nat -A PREROUTING -i $WAN_IF -p tcp --
dport 7881 -j DNAT --to 192.168.1.21
```

This kind of rule would be perfect for P2P apps running inside your LAN. These often need UDP connections as well, so you may need to put in a duplicate set of rules using 'udp' instead of 'tcp' as the protocol.

▲ Editing firewall rules for fun and profit.

Yar squiddy!

No network is complete without Squid, a caching Web proxy server. It's like a turbocharged browser cache for your whole LAN to share, saving downloaded files and pulling them back out as needed so they don't have to be downloaded again. This speeds your Web browsing and, perhaps more importantly these days, reduces your bandwidth use. Install the 'squid' package ('sudo apt-get install squid'), and wait while the post-install script generates the cache folders. Once it's done, open the Squid configuration file:

```
sudo nano /etc/squid/squid.conf
```


▲ Squid's config file is bigger than its giant namesake's.

It's an enormous file, listing every possible option with lots of comments, but we just need to change the access control lists, as Squid only allows connections from the local machine by default. Search (with Ctrl+W) for the text 'http_access allow localhost'. The two lines immediately above that line contain rules to allow LAN access. Uncomment them and edit them to match your LAN – the result should look something like this:

```
acl our_networks src 192.168.1.0/24
http_access allow our_networks
http_access allow localhost
```
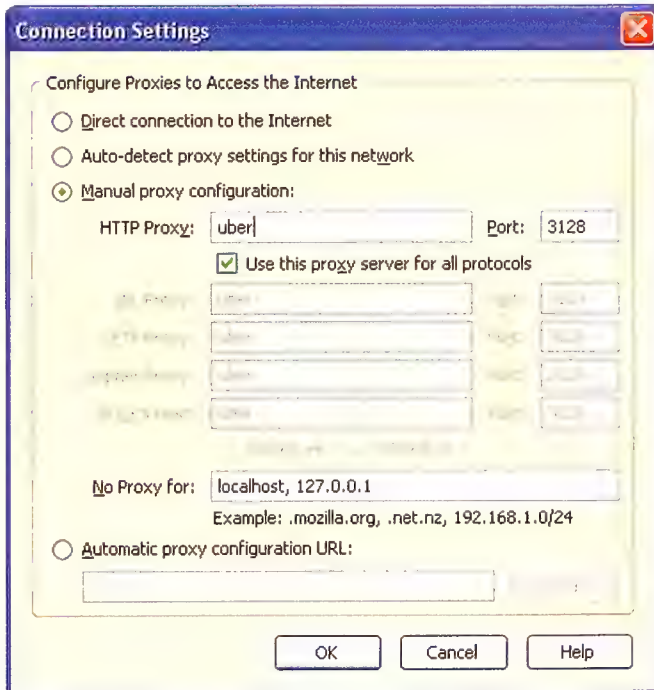

▲ Tell Firefox to use the uber box as a proxy...

Tell Squid to reload its configuration file (sudo /etc/init.d/squid reload), and then configure the browsers on your LAN to use your uber box as a proxy on port 3128. Try opening a page – if you get a message from Squid instead of the page you were after, go back and check your Squid settings. If the page loads, everything should be working properly, but you can watch Squid's logs to ensure that the browser is using the proxy:

```
sudo tail -f /var/log/squid/access.log
```
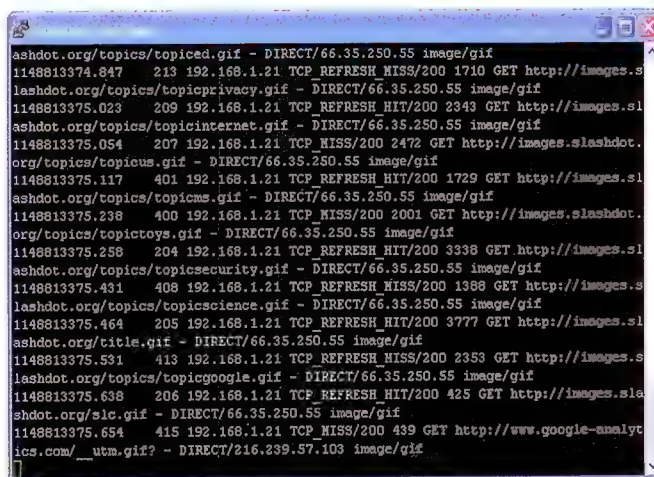

▲ ...and all your downloads should show up in the Squid logs.

Hit Ctrl+C to exit when you're happy. As you can see, Squid keeps track of every file accessed through the proxy, so you can see exactly where your bandwidth is going. You can make the logs more comprehensible with a log analyser, like Calamaris, which produces nice summary reports in HTML format:

1 Install the Calamaris package, and some optional support packages:

```
sudo apt-get install calamaris libgd-graph-perl
libnetaddr-ip-perl
```

2 To enable HTML reports, edit the /etc/calamaris/cron.conf file and change 'mail' to 'web' on the lines that begin with 'daily', 'weekly', and 'monthly'.

3 Edit the /etc/cron.daily/calamaris file and edit the HTMLOPTIONS line to enable some pretty graphs:

```
HTMLOPTIONS="-F html,graph"
```

Calamaris will automatically generate fresh reports every night, but you can run it manually ('sudo /etc/cron.daily/calamaris') – it should appear in the '/var/www/calamaris' folder. It generates a daily report each day, along with a weekly report each Sunday and a monthly report on the first day of each month. To share these files across the LAN you'll want a Web server, but a quick install of Apache, the world's de facto standard Web server, is far too easy:

```
sudo apt-get install apache2 libapache2-mod-php5
```
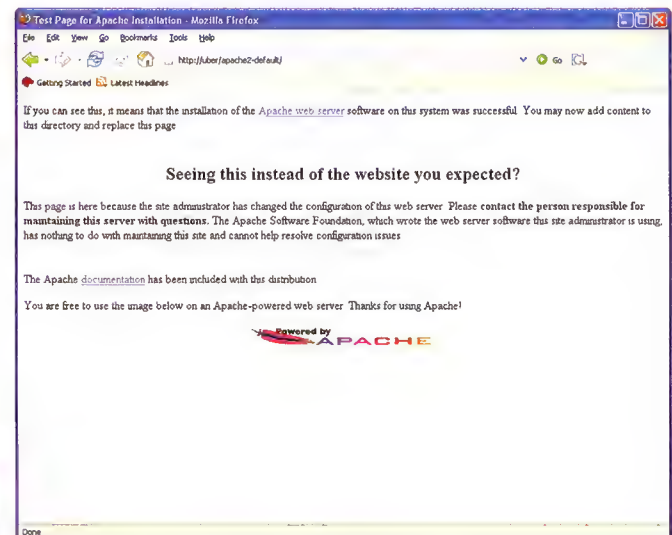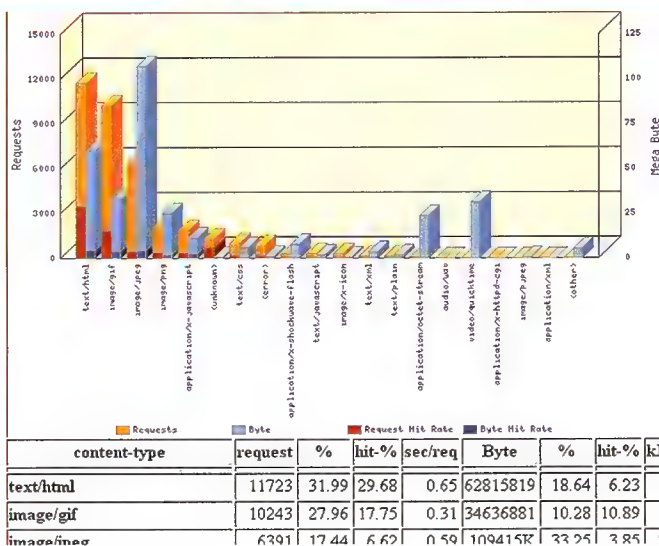

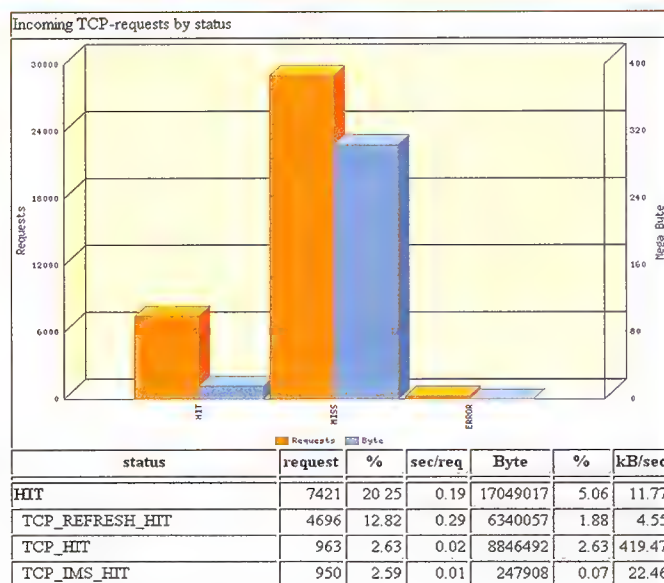▲ Your very own Web server, installed with a single command.

We've taken the liberty of installing PHP support, since it might come in handy in the future – PHP allows a huge amount of flexibility both on your local network or should you ever wish to set up a Website. There's a whole world of PHP apps available, and you may want to install some later. For now, Apache should start as soon as it's installed, and it's configured to share '/var/www' as its root folder, so you should now be able to view those Calamaris reports in a browser by going to 'uber/calamaris/'.

The reports are packed full of useful info, from a list of the most popular sites to stats on the effectiveness of the caching, with lots of shiny happy graphs to make it all easier to take in.

Caching proxies like Squid tend to work best with larger numbers of client machines, but it should return modest time and bandwidth savings even with a single client.

content-type	request	%	hit-%	sec/req	Byte	%	hit-%	kB
text/html	11723	31.99	29.68	0.65	62815819	18.64	6.23	
image/gif	10243	27.96	17.75	0.31	34636881	10.28	10.89	
image/jpeg	6391	17.44	6.62	0.59	109415K	33.25	3.85	

▲ **Keep an eye on popular sites and other stats.**

Sizing, sharing and security

In Part 1 we set up a 3GB logical volume for your /home partition using LVM, and we enabled some basic file sharing. Now it's time to uber it up with some more storage and security. 3GB isn't a lot these days, so if you're already storing a bit of data on your uber box you might be close to filling it. Use 'df -h' to check how close to full you're getting. While 3GB was perhaps a little conservative, we had to keep things small just to show off this next trick: resizing volumes on-the-fly, through the magic of LVM:

1 Run 'sudo vgs' to examine your LVM volume groups – you should see your 'ubuntu' group, with its total size and the free space available for allocation to logical volumes. You can also run 'sudo lvs' to get a similar list of your current logical volumes.

2 Use 'lvresize' to add some extra space to your /home volume:

Incoming TCP-requests by status

status	request	%	sec/req	Byte	%	kB/sec
HIT	7421	20 25	0.19	17049017	5.06	11.77
TCP_REFRESH_HIT	4696	12.82	0.29	6340057	1.88	4.55
TCP_HIT	963	2.63	0.02	8846492	2.63	419.47
TCP_IMS_HIT	950	2.59	0.01	247908	0.07	22.46

▲ **The hit stats show just how many requests and how much bandwidth your proxy has saved.**

```
sudo lvresize -L +20G /dev/ubuntu/home
```

We've added 20GB to it, but using the -L option without a '+' sets an absolute size (ie: -L 20G would set the total size to 20GB).

3 Expanding the volume doesn't expand the filesystem sitting on it, but 'xfs_growfs' makes short work of this:

```
sudo xfs_growfs /home
```

The resize should only take a few seconds, after which running 'df -h' again will confirm the result: a whole heap of extra space on '/home'. Depending on how much space you have available, you may want to add

LINUX FUNDAMENTALS: FILE PERMISSIONS

You've probably worked out by now that Linux systems are pretty strict when it comes to file permissions. Unix was designed from day one to handle large systems with hundreds of users, all logged on at once and happily working away without being able to interfere with each other's work, and Linux continues with that design today. Because file permissions are such a vital part of a Linux system, it's important to know how they work, and how to manipulate them.

Linux – and UNIX in general – uses a fairly simple permissions model. Each file is assigned three key pieces of information:

- a user, ie: the file's owner
- a user group
- a set of permissions bits

Run an 'ls -l' command and look at the first three columns of information: these are the permissions bits, user and group. The first character in the permissions display describes the file type ('d' for directory, '-' for file), but we'll skip that for now. The rest of the permissions display lists three sets of the three available permissions: read ('r'), write ('w'), and execute ('x'). These three sets correspond to the file's user, the file's group and all other users, respectively. An example is a great illustration:

```
-rw-rw-r-- 1 leigh users  949 2006-05-27 12:47 notes.txt
```

Here, the file is owned by the user 'leigh', and the group 'users'. The user 'leigh' has read/write access, as do users in the 'users' group, but other users on the system get only read access.

Read and write are obvious in their meaning, but 'execute' is less so. Files with execute permissions can be run like a program, so it's used mainly for applications and scripts. For directories, execute permissions allow access to enter the directory and view its contents.

To change file permissions, use the 'chmod' command. The easy way is to use the 'r', 'w', and 'x' flags along with a '+' or '-' to add or remove permissions from the owner ('u'), group ('g'), other users ('o'), or all users ('a'). For instance, you can remove group write access to a file with this command:

```
chmod g-w notes.txt
```

Of course, you can only change the permissions on files you own, unless you use 'sudo' to run chmod as root. Use 'chown' to change a file's owner and group – here we're changing the file's group to 'atomic':

```
sudo chown leigh:atomic notes.txt
```

This permissions model is less powerful than NT's Access Control Lists (ACLs), but it's nice and simple, and more than enough to handle typical security needs. Linux does support ACLs if you really need finer control, but they're complex to use, so it's best to stick with standard permissions wherever possible.

atomic

▲ 3GB isn't a lot for a busy /home partition.

▲ Huzzah! Just a few seconds later we have plenty of pr0n-space!

more or less than our 20GB, but it's best to be conservative, because the XFS filesystem we've used doesn't yet support volume shrinking.

As you come to use your networked storage more and more, properly securing it becomes important. Right now, anyone on the LAN can access your files, and that can be a real problem on a shared LAN, or if you have visitors (welcome or otherwise) connected wirelessly. Open the Samba config file (/etc/samba/smb.conf) and make the following changes to enforce password logins:

1 Find the 'security' setting line and make sure it reads 'security = user'. The line is commented out by default, so remove the semi-colon at the start of it as well.
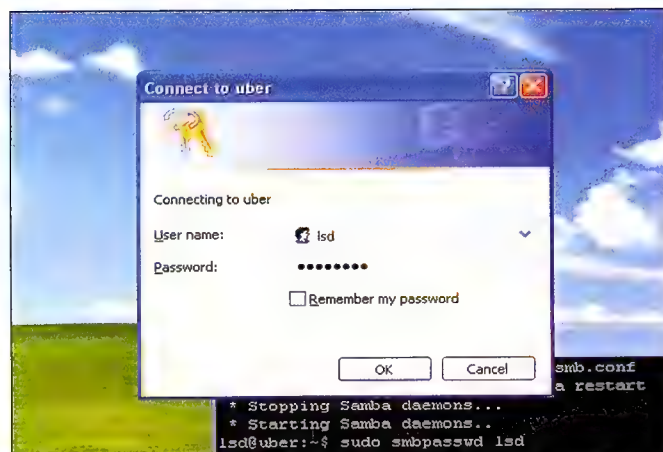
▲ A nice user login to keep prying eyes away from all your sensitive 'documents'.
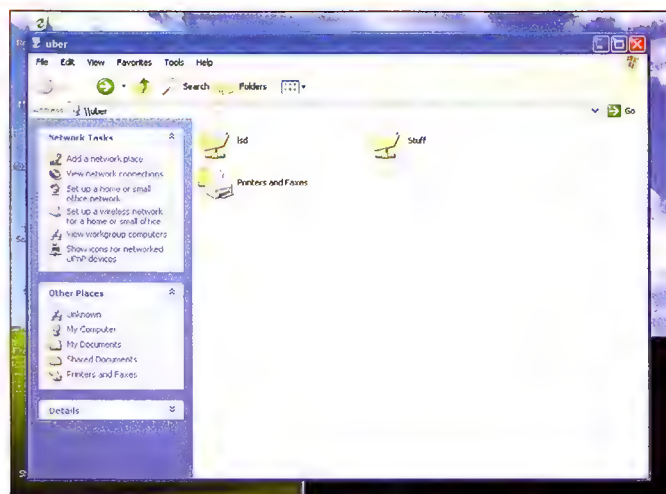
▲ Stuff goes in the Stuff share – easy!

2 At the bottom of the file, you should see a set of options for each share you created through the Shares GUI in Part 1, with the share name in square brackets on one line and its various options listed on the following lines. Change the 'public' option to 'no' on each share.

3 Restart Samba (sudo /etc/init.d/samba restart).

Now when trying to access shares from your Windows system, you should be prompted for a login – the only problem is that we haven't yet set a password for your user. Run 'sudo smbpasswd' followed by your username to set a password, and then log in from Windows using your username and that password. You'll see an extra share when you do, which maps to your home directory. It's read-only by default, but you can enable writing by setting 'writable' to 'yes' in the '[homes]' section of the Samba config.

To keep tabs on your free disk space, among other things, you can install a great little PHP Web application called phpSysInfo. Once it's installed (using 'sudo apt-get install phpsysinfo'), open uber/phpsysinfo/ in your browser to view the output.

Next month

Stay tuned to the same bat channel next month for more Web server shenanigans, file storage that will keep your pr0n collection alive even when your hard drives die, and the most painless OS upgrade you've ever seen!
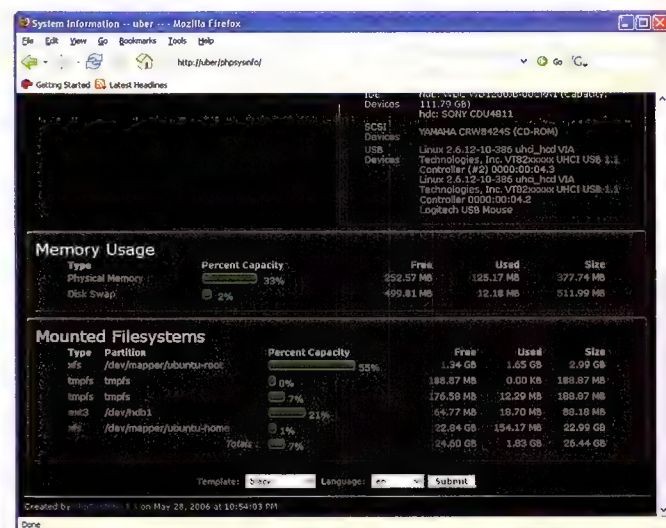
▲ Put that Web server to use with some handy PHP apps, like phpSysInfo.

HARDWARETUTORIAL
BUILDING A NEW FRONTIER

Re-building the beast – Part 2

Ron Prouse continues his epic remodding journey, fighting with aluminium cases, LEDs and glue.

Supplies

Here's a list of the great suppliers and the gear they provided for this project.

PC Case Gear (**www.pccasegear.com.au**)

- 2x Meshx fan guards – 120mm silver, $6.50 each
- 1x Swiftech MCW60 VGA water block, $99.00
- 3 metres of Clearflex tubing, $7.50 per metre
- 1x Asetek 03-L-9010 Waterchill hard drive cooler, $129.00
- 1x Lian-Li TR-3 silver LCD thermometer and fan controller, $39.00
- 1x Lian-Li 80mm airflow duct kit, $39.00
- 1x Ultra X2 550W modular power supply, $189.00
- 1x Cooler Master SAG-K01-U1 liquid, $22.00
- 1x Lazer LED 6 spotlight - red/blue, $11.00
- 1x dual 8" cold cathode light kit – red, $25.00
- 1x dual mini 4" (10cm) cold cathode light kit – blue, $19.50
- 1x SilenX 120mm fan 14dBA, $36.00

Altech Computers (**www.altech.com.au**)

- 1x XpertVision GF6800GS Super 512MB DDR3, AGP 8x, $399.00

Disclaimer

Whenever you pick up power tools, cutting and grinding instruments, or even a can of spray paint, you are putting your general wellbeing at risk from some form of industrial level accident. We take every precaution by wearing appropriate safety equipment, using tools with respect and within their limits, and by not inhaling the contents of glue and paint containers. We suggest that you should follow a similar regime, and seek professional assistance and guidance if you are attempting a task outside of your skill set.

Note: *Atomic* and staff are not responsible for your safety or longevity. Or the hair on your cat remaining one colour.

Tools

The tools used in this part of the tutorial are mainly those found in the average garden variety shed, including a Dremel, jigsaw, sandpaper, metal nibbler, drill press, drills and taps, acrylic sheet off-cuts, masking tape, plastic glue, two-pack epoxy adhesive, 150mm bench grinder, polishing wheels, Josco polishing compounds and aerosol paint.

The main requirement is a decent bench or table, providing a solid, flat surface to operate on.

At the end of Part 1 (see *Atomic 66, page 72*) the concept was to follow up with a tutorial on re-modding the outer covers of my old Lian-Li case. Well, there was an unavoidable change of plan! Instead, this tutorial will be outlining the plumbing and electrical work, with the outcome being a bare but running PC, with the final tutorial covering the front bezel and panels.

1 The first thing was to select a suitable power supply (PSU), an important decision as it can either create or resolve issues around component placement, system stability and even noise levels. Right from the start the objective was to use a PSU that had a modular cabling system – that is, one that has a series of plug-in looms for each connector, as this will make the case cabling much neater and more flexible. The second issue is that the two pumps are powered from the 12V rail, and therefore the PSU had to have enough grunt to meet their 6A requirements, as well as power the additional fans, lights, HDD and ODDs and the graphics card. In a perfect world, the water pumps would be powered off their own dedicated supply, however the next best thing is a PSU with two separate 12V rails. The obvious choice was the Ultra X2 550W, which is not only chrome and sexy, but also had the two 12V rails rated at 17 and 18 amps respectively that we were looking for. Unfortunately, the cool 'Ultra' badge wouldn't fit through the DIN-sized opening in the rear of the case, so we had to cut it off.

2 The next step was to finish off a few additional sections of polished aluminium on the inside of the case – the first of which was to fabricate a cover for the bottom three PCI bays, which aren't being used. A section of 2mm thick sheet aluminium was cut to size, with the inner edge slotted to fit into the retaining cut-outs in the motherboard tray, and then bent at 90° for the outer lip. After drilling a 3mm hole to fit the centre retention screw, the upper edge was profiled so that the sound

card cover would key in neatly. The cover was then polished to a mirror shine. The finished plate will serve two purposes; to add another reflective surface for the case lighting, and also act as a mounting plate for the rear cathode invertor.
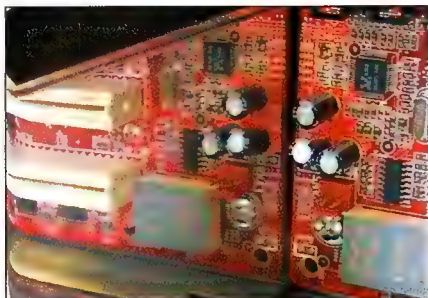
3 Those people who know the use of the fluff-infested, cumbersome PCB below have probably been modding for some time! It is an invertor for a pair of 30cm neon tubes, which were a common sight back in the early 90s. The blue component on the right is, of course, a power invertor for a pair of cold cathodes, which are far brighter and much more robust than the old-school offering. The main advantages of the neon was its rich colour (more like an LED than contemporary cathodes), and the

potential length of the light lead wire, which could be far longer without losing brightness, making it easy to conceal the invertor. Extending the lead wire on a cold cathode more than a few centimetres will usually cause the voltage to drop enough to result in a dull or half-lit tube.
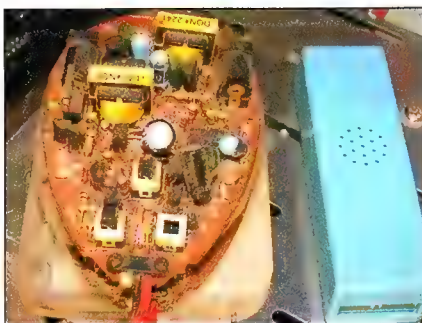

4 There are two options that you have when it comes to something really ugly – you can either hide it from view, or you can give it an extreme makeover! Working with this principle, we have previously hidden the cathode power invertors from sight, so it was time to try out the latter solution. A piece of aluminium L-section, 25mm square outside dimension (OD), had one side cut out, leaving a 25mm square flap attached on one side. The flap was then bent over 90° to close in the end of the U-section, forming a two-sided enclosure. A slot for the two cathode tube connectors was then filed out of the end, and a 13mm hole drilled into the top for ventilation. The cathode invertor was then glued into the enclosure using

five-minute epoxy resin, and the assembly glued onto the PCI cover outlined in step two. This places the invertor within a few centimetres of the two cathode tubes, so the leads can be shortened and sleeved with black mesh.


5 With the plumbing for the dual watercooling system taking up so much room, there's not much space for a concealed lighting system. Nothing detracts more from the aesthetics of a case than a naked light in plain view, so another extreme makeover was required. Our houses all feature lighting in attractive, reflective casings, and this principle should

transfer across. Taking a rectangle of sheet aluminium, a 90° bend was folded to form a base section, and then the upright was curved over a tight radius, starting 25mm up from the base, creating the right shape to house a 10cm blue cathode tube. The light fitting was then polished to a mirror shine,

and once the cathode tube was glued into place it was attached to the centre section of the false floor with 3mm screws. The cathode is now much brighter, due to the polished aluminium reflecting the light upward, and the tube itself is concealed.
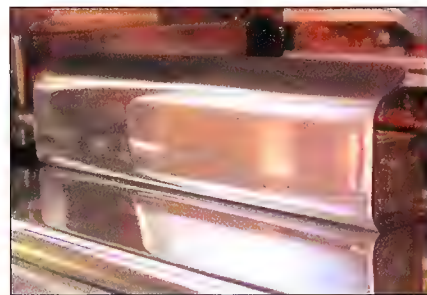
6 Another light fitting was fabricated, this time from 25mm OD U-shaped stock. After being cut to size and polished to a mirror finish, the blue 10cm cathode tube was glued into place with two-pack epoxy resin. To aid in the spread of light over a larger area, a rectangle of opaque acrylic from a fluorescent light housing (with diffusing lenses embossed into the surface) was cut to shape and glued into the front recess. This fitting was then attached to the underside of the pump cover, to stream light out into the mobo cavity, and acts like a LazerLED on

steroids. Another cold cathode, a red 10cm unit, was then placed between the bottom of the case and the false floor, washing colour upward to give the main case area a tinge of red. Speaking of LazerLEDs, red and blue 6-LED spotlights were mounted on the inside of the top-front faceplate, positioned so that the light would shine directly through each side of the reservoir, respectively lighting up the red and blue coolant.
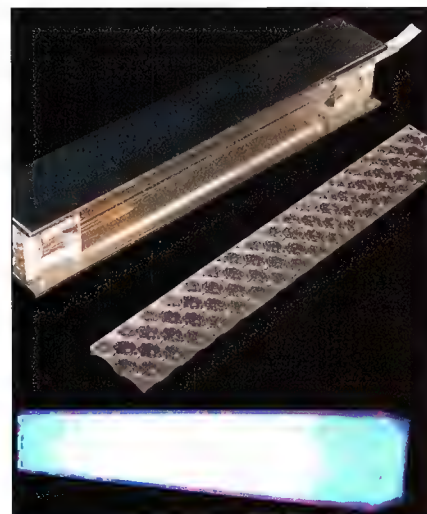
7 To spread the light evenly around the case, there is a short light fitted between the rear radiator and the I/O plate – an LED tube! Now, we have chronicled this before, but it is such a great concept it is worth reiterating.

Using the plastic tube and mounting blocks from a dead cathode, shortened to the required 125mm length, we made a run of five blue LEDs (each with its own resistor – so if one blows the others don't). The LEDs were high intensity, 5000MCD water-clear items from Jaycar (Cat# ZD0182), with the lenses sanded opaque with 1200 grit Wet'n'Dry to

increase the light spread. After running the wires out, the end-block was glued back on with Weldon acrylic cement.

These LEDs are only $2.75 each, so it is a relatively cheap exercise for a custom length unit with a rich colour output. A 30cm red cathode was also fitted to the rear of the case – along the side cover opening – inside a polished L-section of aluminium stock to hide it from view while maximising light reflection.

8 With the lighting installed, the next step is the switch-gear. The original 3.5" bay fan bus from the previous case mod was retained in essence, but converted to a 'light bus' with some slight alterations. The rotary four-pole switches were changed to a pure on/off function to control the lighting, and the knobs sandblasted to give them a matt finish. The existing red LEDs in plastic bezels were removed, and the mounting holes drilled out and countersunk to 12mm. Two pieces of 5mm thick acrylic were laminated together, and a 5mm x 5mm hole drilled into the smaller piece to mount an LED. The fascia section was masked up, and the rest of the acrylic sandblasted, to make it opaque. The LEDs were glued into the block using a dab of epoxy glue, and the resultant look is that the LEDs appear to be floating in mid-air.


9 The monitoring of fan speeds and temperatures is controlled by a Lian-Li TR-3 LCD thermometer and fan controller. This is one of those very loose descriptions, as the TR-3 doesn't actually allow for variable fan speed adjustment, just a rolling display of their performance. What the TR-3 does have is a three-point temperature alarm system that works extremely well, using CompuNurse-style thermal probes. These probes are thin enough to slide under the CPU water-block, and can be placed right next to the die, to get really good indicative readings. For this application, we have used one probe on the CPU and the other two probes at the reservoir outlets, to measure coolant temps. The other display sectors, HDD use, time and power indicator are pretty pointless, but add to the 'busy' factor. Although the TR-3 is finished in the OEM Lian-Li silver and black aluminium, these easy to read little displays could be refinished to look great in any floppy bay.


10 Fitting the water blocks was a typical installation, with the Silverprop CPU and northbridge blocks lapped with 1200 grit Wet'n'Dry sandpaper, polished with Brasso, and Arctic Silver 5 thermal compound applied before they were bolted on. The Swiftech MCW60 GPU water block however offered an alternative to the fiddly mounting systems that are the Achilles heel of most video card water blocks – where tension from water hoses often twists and distorts the block/GPU contact dynamic. The retention mechanisms for the 6800/7800 NVIDIA cards seem to be the most user friendly and robust yet, using the four holes around the GPU to achieve excellent thermal hook-up through spring loaded screws into

a solid mounting bracket – thus the XpertVision 6800GS was perfect for the job. The Swiftech kit also included a tube of Arctic Silver céramique thermal compound and 8x MC14 BGA RAM sinks that come fitted with questionable Berquist thermal tape – we removed it immediately and glued them on with thermal epoxy glue.
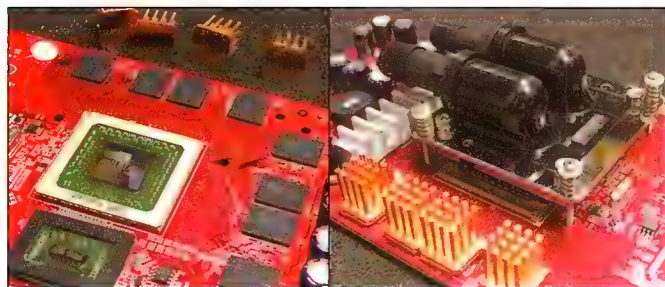

11 The first step was to connect the reservoir up to the two Dangerden filler ports, as this was an important part to get right – otherwise there wouldn't be any fluid getting in! By crossing the hoses over, left to right and vice versa, the hoses were kept at a reasonable arc. There had been some pre-planning here, and the LHS filler port had been placed 25mm higher than the RHS. Running the hoses in this manner had another advantage, in that they were also well out of the airflow path of the top 120mm fan.

The below image, with the fan fitted in place, gives some indication as to how tight the tolerances really are. The fan brackets are seated hard up against the rear of the reservoir, the PSU fits tight against the rear side, while the underside of the fan is 5mm above the higher filler port. The ATX cable has to be folded at a 90° angle the instant that the cables exit the connector, and has to be in place before the PSU is slid forward into its correct position.
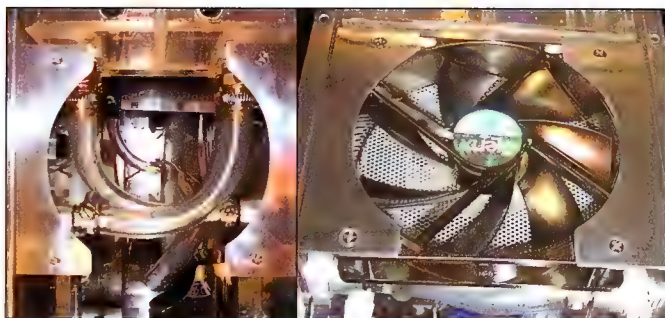
12 The next step was to plumb all of the components together, with careful attention paid to keeping any necessary bends as smooth and shallow as possible. One school of thought maintains that the use of 90° plastic bends will not adversely affect the flow rates and back pressure within a relatively low-pressure liquid system, however we have definitely observed otherwise in practical application.

So, with 12 hoses (and therefore 24 joints) to install, our main objectives were to keep all of the hoses as short as possible, retain a smooth flow, and keep the aesthetics right wherever possible. Screw-tight clamps were used on all of the connections, just nipped-up lightly to add some mechanical strength to the joints. Over-tightening clamps can distort the tubing and actually create leaks, especially on plastic fittings, so the trick is to keep them just to the point of 'firm'.
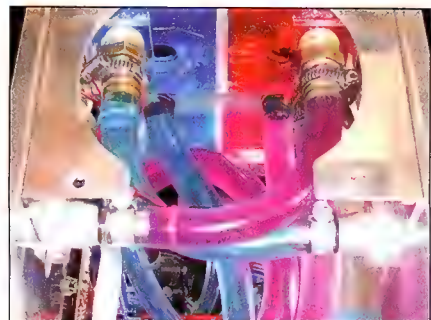
13 We have always wanted to create a computer that looked like it was hooked up to a human circulatory system, and here it is. We chose the right (red) side of the reservoir for the CPU/northbridge (NB) loop as it gave the best entry and exit angles for the NB return and radiator feed lines for the main cooling loop. The flow cycle is from the pump-CPU-NB-reservoir-radiator, with the filler port as a T-line into the reservoir.

The blue, secondary loop follows a similar route of pump-GPU-HDD-reservoir-radiator, with the filler port again fitted as a T-line. The main loop was constructed from 0.5" ID Clearflex tubing, while the secondary loop has two sections of 0.375" ID tubing to accommodate the Asetek hard drive cooler.

As an aesthetic feature of the cooling systems, the red and blue hoses were routed across the centre of the case window position, held together by a clear bracket made from a 5mm thick acrylic off-cut.
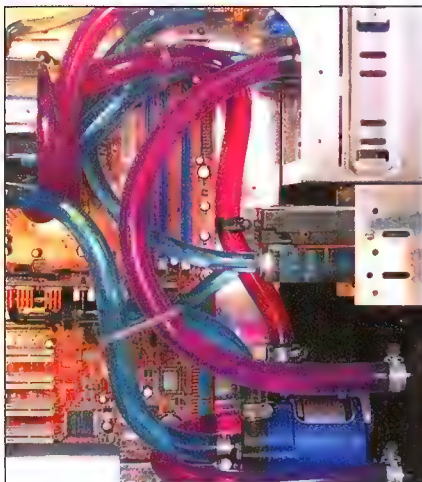

14 How do you make any light more effective? Use a reflector. As mentioned, a polished L-shaped strip of aluminium was mounted at the rear of the case (far left), so that it will reflect all of the light towards the case centre. This is a really good idea for any case, but it works to its maximum effect on a dull finish, such as a steel or painted interior. The cathode is then mounted in your favourite manner;
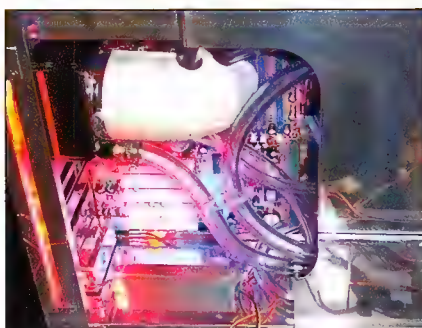
in this case two-pack epoxy glue was used.

To clean-up the interior hose clutter, a chrome cover from the Lian-Li 80mm airflow duct kit was attached to the rear radiator, and then shaped so that the CPU/NB hoses were concealed. The use of two 30cm IOSS single drive IDE cabling also helped to minimise visible wiring within the case cavity.

A final addition, maintaining the original polished aluminium theme, was a sculptured cover-plate for the area over the 3.5" and 5.25" bays, stretching back toward the rear of the case and covering the filler port opening.
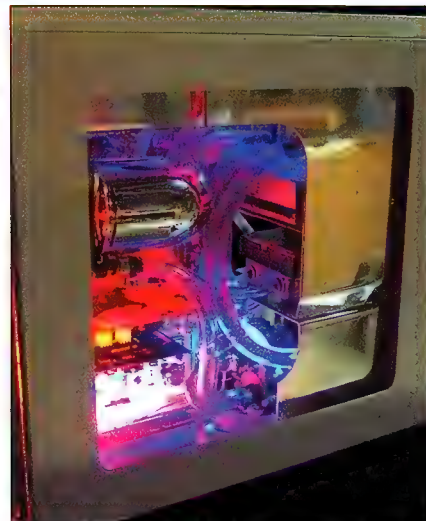
15 If you flick back to Part 1 of this tutorial and check the original planning sketches for the top of the case you will notice that we have reversed the colours in the top port-hole! Still, the end result is on course to meeting the original drafts.

At the end of this tutorial, the box is a fully functioning PC, minus all of the external sheet metal. Part 3 will chronicle the work on the outer covers, which is where most of the reconstruction work will take place, including a larger top blowhole, window change, power switch mod and reworked front air intake.

POLISHING MADE PERFECT

Polishing aluminium is fairly easy. After all, it is a soft metal and there are a plethora of products on the market designed to accomplish this exact task; Autosol and Brasso are two that immediately come to mind.

Polishing to a sheen is one thing, but to get a mirror shine requires a whole lot of preparation work before picking up that tube of fine abrasive – especially if you are working with sheet aluminium. Bending and shaping sheet metal will invariably result in waves, ripples and bulges in the surface, and polishing will only accentuate these blemishes. So the starting point is a metal file, which will remove the major imperfections. It then gets progressively smoother until the part is ready for fine polishing with a buff.

The component in this picture is the light fitting outlined in step 5, with the progressive steps shown (starting at the top), where the LHS of each image shows the previous step compared to the next step on the RHS.

The LHS of the top image shows the component after filing off the high spots and contusions. The part

is filed along one direction, like following the grain in wood, and the radius of any curves should be kept as regular as possible. The RHS shows the second step which is sanding with 120 grit carborundum sandpaper.

The RHS of the second image shows the part after sanding down with increasingly finer grades of sand-paper, right down to 1200 grit Wet'n'Dry. By this stage there shouldn't be any visible imperfections, just an even lightly scoured surface.

Image three shows the effect of Autosol metal polish, with a good degree of surface lustre and shine, although some fine scratching is still visible.

The fourth image shows the final finish, after using a bench-top buff with Josco specialty polishing compounds – notice the clarity and integrity of the reflected text on the RHS of the picture.

The final image is the inside reflective surface, with a cold cathode tube installed, where the LHS has been polished and the RHS is a mirror finish. Looking at the camera flare, the amount of additional reflection is obvious.
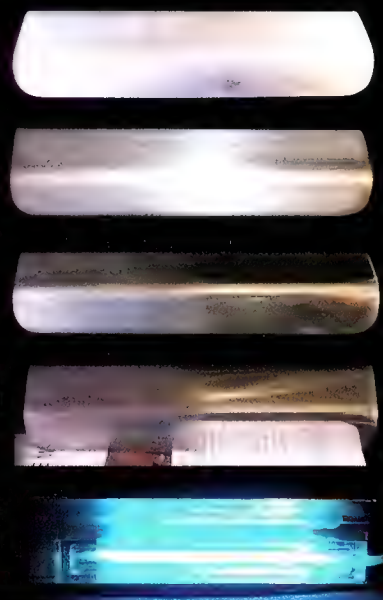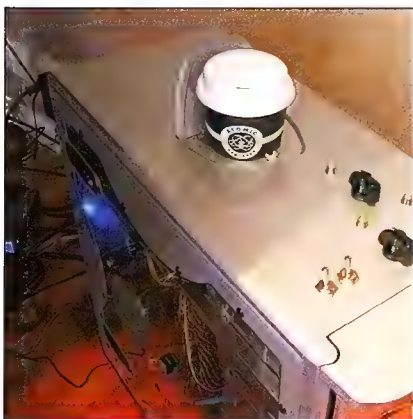
ATOMICHOTBOX

Welcome to Hotbox! Each month you'll find the winning Hotbox of the month and runners up as voted for online at **www.atomicmpc.com.au/hotbox.asp**. Want to win? Submit your box now!

RUNNERS UP ▼ RUNNERS UP ▼ RUNNERS UP ▼ RUNNERS UP ▼ RUNNERS UP

Café Prescotti

technicaldetails

- Intel Pentium 540 @ 3.6GHz
- 2GB dual channel Kingston DDR400
- ASUS P5GD1
- NVIDIA GeForce 7800GTX
- 200GB Seagate SATA
- Pioneer DVR109

Defyant's STORM'D

technicaldetails

- Intel Pentium 4 3.4GHz @ 3.8GHz
- XFX GeForce GT6600 PCI-E
- Western Digital 160GB HDD
- Custom STORM water tanks
- Swiftech MPC350 pump
- Matrix Orbital monitor

Teen's Touch

technicaldetails

- AMD Athlon XP 2000+
- 80GB Seagate HDD
- NVIDIA GeForce FX5200
- Tri-colour sound reactive neon
- 3x tri-coloured LED fans
- Flexiglow EL wire & invertor

atomic

hotbox
OF THE MONTH

Ken's R2-D2

Several months ago while at a local gas station, I saw that the owners were throwing away one of those R2-D2 Pepsi coolers. It had been badly abused and was split down one end. Right then and there I knew I wanted to have one just like it. The finished product has not only allowed me to run my 3.2GHz P4 @ 3.7GHz and -38°C, but has capitalised on my home office *Star Wars* theme. The project turned out better than planned and even closely resembles the R2-D2 cooler, except mine weighs nearly 50 kilos! That lets me know that I did it right the first time and there is nothing I can think of to make it better.

Ken

- Intel Pentium 4 3.2 @ 3.71GHz
- 4x 512MB DDR400
- 120GB HDD
- ATI RADEON 9800XT 256MB
- Creative 7.1 surround sound
- Asetek Vapochill phase change cooling @ -38°C

Fame, fortune, and free stuff can be yours! Send your Hotbox to hotbox@atomicmpc.com.au and include the following:

- 3-4 high resolution, well-lit pictures.
- A 250 word description of how you made it, the obstacles you overcame, the tools you used, and your inspiration.
- A detailed list of the machine's specs.

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- ➤ 4 Optical Inputs
- ➤ 3 Ethernet Inputs

OUTPUT
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GAMEPLAY

GAMES, GAMES AND GAMERS — ATOMIC-STYLE

It's almost like the Xbox never happened. One could easily be fooled into believing that Microsoft's balls-out foray into console gaming was just a funny dream. For now that the 360 is out the Xbox games have dried up almost completely. Not a single Xbox game has arrived here for review in the last two months and we can count on one hand the number of Xbox games in total since the 360 was released.

So much for the 828,477 Australian Xboxes. Things aren't much better for 360 owners either. Now, there's always a seasonal slump in game releases this time of the year. It's the post-E3 drought, when all the developers get back to the normal routine of games development, and being away for the two months or so it takes for a developer to prepare demos for E3. But being the slow time of the year hasn't affected Sony. Almost every day a new game is released, whether for PS2 or PSP, which is really ramping up.

Sony learned well the impact abandoning a platform can have. When the PS2 was released we faced exactly the same situation we are now with Xbox. An almost complete halt in releases for the legacy console. While most of you are likely in the 'early adopter' category, let's not forget that there are many hundreds of thousands of typical families that had invested in the PlayStation and depend on it as a main entertainment source. Nobody expected the games to stop just-like-that and

a whole lot of anger and disappointment was flung at Sony for seemingly abandoning its user-base.

Sony has since pledged to support the PS2 well into the life of the PS3, and it can too. While third party developers do what they please, and in most cases that means moving on to the newer technology, Sony's own development studios, and those owned or invested in by Sony can pump out games for whatever platform Sony dictates.

Just like Microsoft can. Its aggressive spending spree of buying up developers over the last few years ensures it can call the shots and steer the market any which way it chooses.

So where are the Xbox games? What's a gamer to do if they aren't ready to upgrade just yet? For that matter – where are the 360 games? The post-E3 slump seems to have hit the 360 almost as much as the Xbox.

The only winner in this is the PSP, which is seeing new games on almost a daily basis. I feel like I've been forced to play the PSP as a result just to get my new-game-fix. I like that. PSP is maturing wonderfully, but I'd be downright cranky if all I had was an original Xbox and an itch for new gaming action.

Ben can count to 828,477.
ben@atomicmpc.com.au

short circuits

Another month, another game based on a television show. This time it's *Lost*, the hit series about a bunch of weird people stranded on a really weird island. Set for release on just about every platform you care to name, *Lost* is being developed at Ubisoft's Montreal Studios.

Uwe Boll doesn't want to fight Gandhi or Ernest Hemingway – he wants to fight his critics. Or rather, five of his most outspoken critics. His plan is to fly them to Vancouver, at which point they'll be able to strap on boxing gloves and beat him senseless as part of a scene in his current project, Postal.

By the time you read this, an open beta for Battlefield 2142 could very well be available. On top of that, developer DiCE has also announced that a demo should be available just over a week before the full version hits stores.

Sony is currently trialling PlayStation Portable vending machines throughout the United States. Obviously, payment is limited to credit and debit cards... but it's still an interesting concept. Apparently it's been quite successful, too. Still no word as yet on whether we'll see them in Australia, though.

Lights, camera, action!

Hollywood is having even more of an influence on games development than you'd think, reports Christopher Taylor.

She walks into the room and she's as nervous as hell. It shows. After a short introduction, she launches into her audition. To be honest, she's a terrible actor. But then something changes... something inside her switches on and she suddenly becomes a lot more confident. The drab room and camera fade away and we find ourselves watching her pace the length of a kitchen, waiting for her unfaithful husband to return home.

In a short space of time, her performance has gone from laughably bad to downright moving. Within the space of a few short moments, she's gone from happiness to sadness to bloodthirsty rage. It's captivating, heartbreaking stuff... and it's a trailer for a game.

The game is Heavy Rain and you can check the trailer out here: **files.filefront.com/Heavy+Rain+The+Casting+E3+2006+Trailer/;5058523;;/fileinfo.html**. Yes, the lip-synching sucks, but the whole thing was a rush job for E3.

Like Fahrenheit before it, Heavy Rain is an example of what developer Quantic Dream terms 'interactive cinema.' Put simply, interactive cinema is about telling stories that are as believable and interesting as those you might encounter in a film.

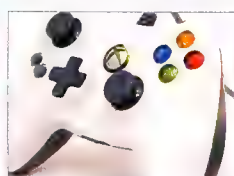Central to the format is the idea of 'elastic

Next Generation Rendering
Depth of Field
Auto Exposure
High Dynamic Range

Thanks to Quantic Dream, we'll finally get realistic kitchens in our games.

writing.' Think of it this way – two people play through the same game, each of them making different choices at the various branching points in the plot. While they'll both experience different scenarios and scenes, the story essentially winds up in the same place. In other words, the journey's different, but the story's the same.

Another important factor in all of this is characters. Rather than just placing you in the shoes of the hero, interactive movies are about letting you take control of all the main characters – similar to how a film might follow someone other than the protagonist for a while.

As can be seen in the trailer for Heavy Rain, there's a huge emphasis on animating characters so they behave in a realistic fashion. Ignore the lip-synching – pay attention to her body language and facial expression. It's spot on.

Quantic Dream has two goals in mind. The first goal is to attract established screenwriters, actors and directors to try their hands at games development, and the other is to make games more accessible and appealing to people who've shunned them in the past in favour of cinema and television.

Mary can't believe that someone took all her hard boiled eggs from the fridge. And you can really tell she's mad!

geekette
A girl's eye view of the gaming world.

If a million crates blow apart in real-time, but no one's there to see it, did it really happen?

If a tree falls in the forest, and there's no one around to hear it, does it make a sound? More importantly, does it actually fall?

Let me explain. We can easily apply the logic behind this riddle to real-time physics – if a tree falls in a game, and there's no physics engine to calculate it, does it affect gameplay? If we are to believe the boffins developing the latest in real-time physics, then yes it does.

AGEIA believes that this moment of woodland hijinks so substantially enhances a player's experience that it deserves its own piece of dedicated hardware. The breakthrough PhysX card can have that tree cracking and falling in no time, with every branch and leaf lovingly rendered and appropriately displaced in real time as it collides with other trees on its descent, and eventually crashes into the ground. Not to mention the dust that will kick up at the moment of impact, and the splinters that will fly into the vortex generated by the fall. Provided you have a computer with a graphics card powerful enough to actually draw all the components on the screen – and a wad of cash burning a hole in your pocket.

Havok also feels that this tree warrants true physical expression, but has taken a more evolutionary approach with their HavokFX physics engine – running it on ATI or NVIDIA graphics cards rather than on a sepa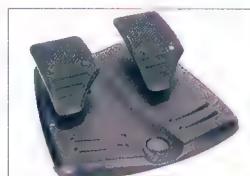rate dedicated physics card. Although more readily affordable, this system is still fallible as the graphics card must share its power between visuals and effects. As an animator, I tend to be more interested in what Havok is doing with its IK (Inverse Kinematics) solutions in regards to a character when they come into contact with said tree, rather than whether or not the tree actually falls.

Developers can't assume that every target gamer will automatically buy their hardware or already have a powerful enough computer and graphics card to support their physics engine, and therefore can't put in any physics that affect gameplay on the processing unit. This means that any diverted processing is limited to effects physics (such as smoke, water, or debris). Although I believe that real-time physics is important to gameplay, and something that could readily enhance the user experience, a cleverly-designed game shouldn't have to rely on it.

Katamari Damacy is a physics-based game that is easily entertaining without a dedicated processing unit; the appeal of the game lying with its simplicity, uniqueness, and quirky humour, rather than real-time special effects. So, whether or not that tree falls in the game, my Katamari will still roll it up.

Kate Inglish is currently an Animator at Blue Tongue. Prior to games development, Kate spent six years in screenwriting, and short film. She studied in the arts in Canberra where she is still involved as a writer for the Women in Screen Festival, presenting regularly, sometimes on the topic.

TALKINGHEAD

TALKING HEAD

One man, one ship

Logan Booker loves Nathan Fillion and is horribly addicted to X3.

The last couple of weeks for me have been consumed, heartily, by X3: Reunion. Seriously, I have no idea where those weeks have gone – behind the couch, bottom of my bag, on a dirty blanket in the street somewhere being flogged by a homeless guy. It's a mystery.

I blame it all on *Firefly* and indirectly, Joss Whedon. After seeing that handsome Captain Malcolm Reynolds (played by the imperturbable Nathan Fillion) ride across the stars like some sort of extraterrestrial cowboy, I couldn't stop myself from strapping on a pair of spurs and suspender pants in search of a space-faring derelict of my own. It didn't matter that I'd never owned a set of spurs – ever – or that my only pair of suspender pants were in the wash with my anorak and safety blanket. By gum, I was going to get a ship even if it cost me my entire stamp collection.

Ignore for now the rather graphic picture of myself as King Nerd of Nerd Island – I really knew I'd have to find a space sim of some sort to deal with my cravings, especially as there are only 14 episodes of *Firefly*. My first thoughts zoomed, much like a certain brand of sedan, to Ian Bell and David Braben's ever-so-famous Elite.

It kind of sucks the game is 20 years old, and that the fourth game in the series is AWOL, although supposedly in development. It's like the Duke Nukem Forever of the niche space trading genre.

Although I'd never played Elite, I had spent stupid amounts of time in its sequel, Frontier, amazed by the awful solid-colour polygons and wrestling with the counter-intuitive (but accurate) Newtonian flight model. Obviously Frontier was way too old for me to pick up again and so… I turned to X3.

Yes X3, that sprawling, ambitious spiritual successor to Elite by German developer Egosoft that promised so much yet failed to deliver, like that postman who gets intoxicated off the fumes of his van and refuses to have the exhaust looked at, despite a foreboding police record detailing a series of hit-and-run incidents involving letterboxes and witch's hats.

I will admit some persistence was required on my part; I even quit once. But, I was desperate and after a quick search on Google returned a bunch of sub-standard or incomplete alternatives, I loaded up X3 with renewed enthusiasm. The interface, which you may have read about, is about as easy to understand as the English fire emergency instructions in a dodgy foreign hotel. However once you wade through it all, taking time to learn the menus and what's achievable, the amount of depth is almost unfathomable.

X3 allows you to truly play it however you want. There's no single objective, unless you play the game in story mode. Yet even then, you can trade in your little ship, slowly buying bigger guns and shields; hunt pirates and earn cash through a police license; capture ships and sell them or build a fleet of transports and lay down the foundations for a sprawling economy of food, ore and weapon factories.

This is what open-ended means to me: Setting my own goals. Egosoft went to the trouble of building an economic model that follows the resource chain from the simplest of goods to the complex, implementing criminal and government elements and building a good space sim engine on top of it all – all so players could do set their own goals. Sadly for Egosoft, and the rest of the gaming community, the developer just didn't apply the same effort to tutorials and manuals to explain *how* you go about playing the game.

That… and designing a UI that doesn't require one to know ancient Hebrew or possess a talent for precognition.

Regardless, if you're looking for an Elite contender and tried X3 – try it again. With a little bit of effort, you'll find a universe of opportunities.

Logan knows everything you've ever said or done.
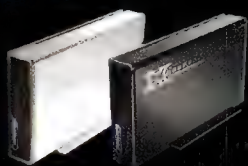**logan@atomicmpc.com.au**

atomic

Release Date Q4 2006

Warhammer 40K: The Dark Crusade

Warhammer 40,000: Dawn of War was a breath of fresh air for the real time strategy genre. We were getting sick of tanks and infantry with machine guns and grenades and other mundane munitions. The gaming world was in desperate need of some sci-fi real time strategy action.

Then in came Relic with Space Marines and Eldar to brighten up our day with streaming hot laser love. With a great group unit mechanic, attachable artillery, four sides with their own strengths and weakness that played differently enough to be unique but had enough basic, common foundations that you were never lost, Dawn of War was a hundred kinds of awesome.

Now we have The Dark Crusade, an expansion much like Winter Assault, but with the inclusion of two new sides – the Tau and the Necron. If the four in the original weren't enough for you, then six will be plenty.

The Tau use a combination of advanced technology and enslaved races to power its war machines, while the Necron travel around as a bunch of skeletal robots, raising the dead and controlling the forces of the undead. As you would expect, the expansion will feature new campaign missions to show off the new sides.

Both sides, like the original four, have their own super units, the Necron for example have a giant floating city, called the Monolith, that can bring forth great swarms of insects to attack its enemies.

We're really looking forward to getting into this expansion. With more sides, missions and unit types than you've ever seen (at least in Dawn of War), there's much fun to be had in both single and multiplayer.

GAME INFO Platform **PC** Publisher **THQ** Developer **Relic** Website **www.relic.com**

Release Date July 2006

Nightwatch

If you haven't seen the *Nightwatch* film (just the first of three to be made) based on the novels by Sergei Lukyanenko, then do so now. Although it is a little uninspired, the movie is entertaining viewing.

Basically the world has two sides – light and dark – and it has nothing to do with timezones. The two sides have followers, called the Others, that possess special powers in much the same way as the X-Men to use a modern comparison. While you'd expect the light and dark to be at each others' throats, a long-standing agreement keeps an uneasy peace, where each side makes sure the other stays in line, and so maintaining a balance of both.

Things of course don't stay this way.

The dark Others are a little more disruptive than their light counterparts and so the Nightwatch was formed to make sure the dark Others don't get too rowdy. The game we're looking at here has you playing an Other in the Nightwatch and, as you'd expect, you get a chance to play around with some funky stuff.

Based in Moscow, Nightwatch is really an RPG in ushanka clothing. You start the game already decked out with a few abilities, dependant on which line of character development you wish to pursue – shape shifting, enchanting or magic. As you progress further into the game, more powers and abilities open up to your character, of which you'll have 70 to choose from.

Although the game references the movie, developer Nirval promises it will have new scenes in the game that follow the story. We're also in for a 'thrilling plot with unexpected turns' as one would expect from any RPG worth its salt. Throw in some destructible environments (a la Nirval's other RPG title Silent Storm) and you have a decent-looking sci-fi role-playing title in the making. Good to see someone breaking away from the stale mix of wizards, warriors and thieves.

GAME INFO Platform **PC** Publisher **CDV Software** Developer **Nirval Interactive** Website **www.nirval.com**

Release Date Q4 2006

Star Trek: Legacy

Star Trek games have had mixed success. Take Birth of the Federation, a great 4X strategy title from Microprose. It was a bit of a sleeper hit but a grand example of *Star Trek* done right. Klingon Academy is also a notable favourite, bringing out the starship captain in all of us, even if the title suffered from bugs galore.

We've also had a few real time strategy titles, most of them from Mad Doc Software. The company's last RTS title, Empire Earth 2, was a moderate success despite a lacklustre interface.

Now Mad Doc, with Bethesda as publisher, is looking to bring its expertise to yet another *Star Trek* RTS – Star Trek: Legacy.

Legacy is a very ambitious project. Not content with servicing just one era in the *Star Trek* canon, players can expect to manage a fleet of ships ranging from *The Original Series* all the way to the doomed *Enterprise*. Although it's highly unlikely we'll see appearances from William 'Bill' Shatner or Scott 'Quantum Leap' Bakula, there will be Borg Cubes, Enterprise Ds and Birds of Prey from here to the Delta Quadrant.

The emphasis for Mad Doc is massive fleet battles, and it's working to remove all the complexity required in most strategy games to manage large numbers of units. There's still a lot of customisation, with the developer promising not only the ability to build ships, but to add specialised equipment to create a truly unique armada of flying metal phaser death. This is moderated using 'Command Points', earned as you venture further into the game.

Behind it all is a nifty 3D engine, which will apparently support a wide range of particle effects for weapons and shields. There's nothing quite as satisfying as watching a torpedo rock a starship, the shields lighting up that pale blue colour and the hearing accompanying sound effects of bacon hitting a hot frying pan. Ships will blow up, and the game engine is up to the task of modelling every ravaged warp core and scorched warp nacelle.

The single player campaigns, of which there are three, will be based on everyone's favourite intergalactic diplomats and good Samaritans – the Federation. These campaigns will cover *Enterprise*, *TOS* and finally *The Next Generation*.

We hear that 60 ships will be available for play. This covers all the races – Romulan, Federation, Klingon… if it flies in space in *Star Trek*, it'll probably be there.

The game will find its way onto PC and Xbox 360 and yes, Xbox Live is supported and includes matchmaking and player ranking.
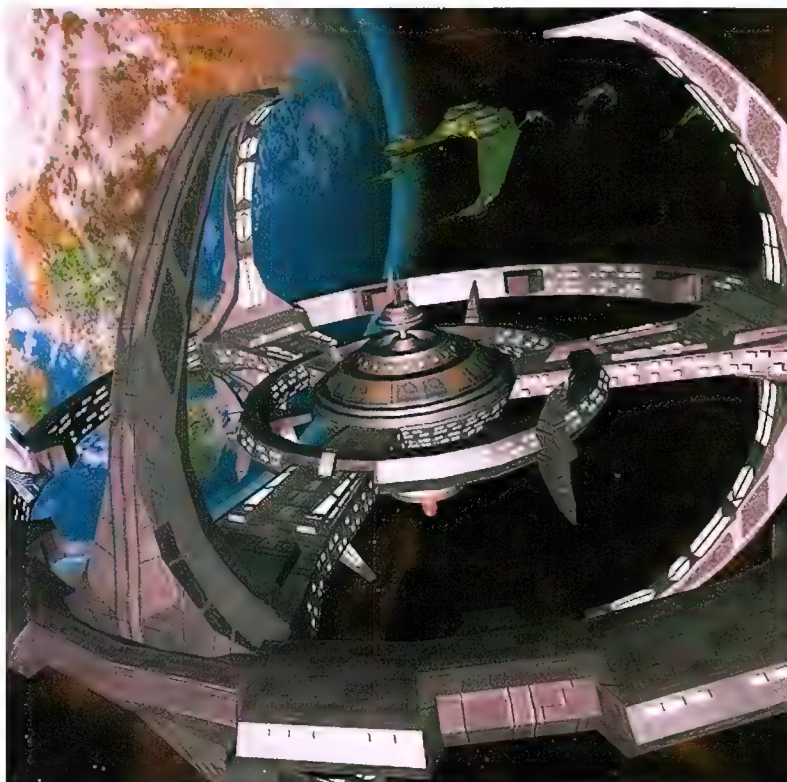
GAME INFO Platform **PC, Xbox 360** Publisher **Bethesda** Developer **Mad Doc Software** Website **startrek.bethsoft.com**

CAUSE &

Logan Booker topples a few corrupt governments with Avalanche Studios and its upcoming free-roaming island adventure Just Cause.

Some would say that 'open-ended' is a buzzword many developers use to describe a game without focus. It might surprise you to know that a lack of focus is key to designing an open-ended game – as soon as you start forcing the player down a certain road, there's no way a game can truly call itself 'open'. Leaving it up to the player to decide where the focus should be, providing them the tools and giving them a reason to achieve certain goals is what ultimately supplies the player with that feeling of freedom.

Open-endedness is used to describe quite a few games these days, and it's important to define why these games are worthy of such a classification. For Far Cry, it was throwing the player onto an island, telling them to go somewhere and letting them decide exactly how to get there, be it on foot, air or jet boat. In the case of Grand Theft Auto, open-endedness was defined by fast cars, random tasks and lots of guns in a city populated by police, crime mobs and the average Joe, thus promoting emergent gameplay.

The aforementioned titles have both been critical successes, so the argument for open-endedness, be it 'just' a buzzword or a total design philosophy, is strong. One could conclude that a game that combines the accessibility of the island in Far Cry with the complexity of GTA should have the makings of an idea fit for a great game.

It seems Avalanche Studios had such an idea, and named it Just Cause.

CHANGE OF PLAN

Odd Ahlgren is the design director on Just Cause at Avalanche. According to Ahlgren, the content of the game is 'the fuel that propels the story forward'. This of course raises the obvious question – what is Just Cause about?

'In short, you take on the role of the rugged but suave secret agent Rico Rodriguez. You are a lone wolf, a bad-arse and an expert in what is referred to as "regime change",' says Ahlgren. Regime change is just a nice way of saying 'assassin'. The player, as Rico, is tasked with a secret mission to 'change' the government of the lovely sun island republic of San Esperito from nasty to nice. In order to do this, you need to take out Salvador Mendoza, the island's dictator who is apparently a bit of a bad-arse himself.

'To aid you in your endeavours [you'll have] blonde bombshell Maria Kane and veteran agent Tom Sheldon… They drive around in a top-modern RV, dishing out assignments and drinking Mai Tais while looking for a way to take care of El Presidente,' he says.

No government has ever been toppled by three people (well, no constitutional monarchies at least) so you'll need to leverage help from a number of groups on the island. These include two drug cartels – one that has allegiance to the government and the other very keen to overthrow

'Freedom' is the word in Just Cause. As is 'explosion', 'guns', 'pants' and 'lemmings'.

EFFECT

San Esperito is a powder keg waiting to blow. You are the spark...

it. Also, hiding in the jungles of San Esperito is a guerrilla faction that works in more subtle ways. It's up to you to decide who you'll turn to for help and what form it will take.

'San Esperito is a powder keg waiting to 'blow. You are the spark that will ignite it,' says Ahlgren.

OPENING A CAN OF ENDEDNESS

In the introduction we compared Just Cause to Grand Theft Auto, and for good reason. Just Cause not only has cars for you to drive, but parachutes too. You'll have many a chance to perfect your controlled falling skills as you descend on your hapless foes.

'The world of Just Cause is one of the major features of the game. It is the first game using the Avalanche Engine which enables players to go anywhere at any time without encountering weird invisible walls… or other strange limitations,' explains Christofer Sundberg, the game's creative director. Sundberg is responsible for coming up with the original concept for Just Cause.

'We also have the parachute which is an excellent tool to have lots of fun, but also a tool to help you complete the missions in the game. Players can use the parachute for carjacking, sneak attacks, spectacular escapes or simply for base-jumping, parasailing and skydiving.'

In fact, the player has many, many options at their disposal to complete the numerous assassinations, race missions, collect missions, deliveries, hijackings and other tasks available on the fictional landmass of San Esperito.

'The player is free to perform hundreds of side missions and roam to their heart's content across the 250,000 acres

of land that is San Esperito,' says Ahlgren. That doesn't at all mean the developer has gone equally crazy with the central plot.

'The storyline itself is straight as an arrow and sharp as a razor. We want to present an equal mix of freedom and scripted events.'

Cramming 250,000 acres with content is a big task, and proved a challenge for the fresh faces at Avalanche. The developers decided to tackle the problem on multiple fronts by using a combination of fixed features (such as story points) and random encounters to make the world a dynamic, interesting place. There's not much point in having an entire island to play on if there's nothing to do.

SUAVE ENGINES

Technological flexibility was important for Avalanche when creating Just Cause. With the freedom available to the player in the game, it only made sense to incorporate the trait into the engine. To this end, Avalanche has embraced new graphics technology while keeping a close check on the minimum requirements.

'We've based the engine around Shader Model 2.0, which has a really large install base and is powerful
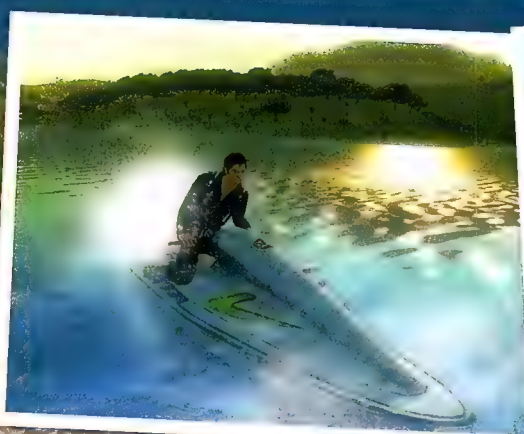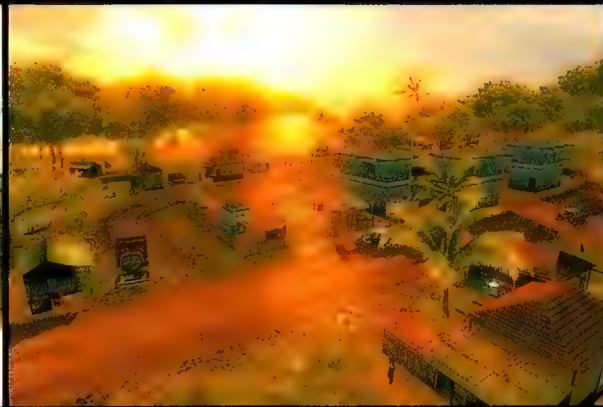
8   19   20

enough to let us do everything we need,' explains Linus Blomberg, co-founder and technical director on Just Cause.

'We have full HDR rendering, most models have normal maps and specular maps. We even use parallax mapping for the terrain, which gives a great sense of depth and detail. We also have soft shadows through dynamic volumetric shadowing.'

The Avalanche Engine took three years to create and perfect, Blomberg and the rest of the team starting from a blank slate, with the only middleware involved being Havok for physics. Avalanche did consider PhysX but wasn't satisfied – the API just didn't meet the needs of the game.

'We haven't used PhysX for this game, mainly due to the lack of a good vehicle component. But that doesn't mean we won't use it in the future,' says Blomberg.

The world itself is created using procedural programming – that is, content created through fixed functions rather than by hand – and Blomberg has a great deal of experience in this regard. The landscape rendering for example is done via procedural coding, greatly reducing the development time of the game as far as assets are concerned.

JUST BECAUSE

Just Cause is buzzing with development – in a good way that doesn't involve bees – and we can't wait to check out every metre of the 250,000 acres of area in the game.

'We are very excited to see Just Cause coming to a completion after over three years in development,' says Sundberg.

'As we started up we were six guys sitting around three desks in a corner of an office. As Eidos showed confidence in the project it's been a really interesting development for Just Cause and Avalanche as a company.'

The developer is now working at full steam and the game is due out in

just a few months. Avalanche won't be sitting idle once it's done though, and in fact is already working on three other projects, which we hope will be just as ambitious and open ended as Just Cause.

'After growing 400 percent over three years, we have now established the company,' says Sundberg, 'both as a new developer on the tough international market but also as a good employer of development talent, which is very flattering considering we haven't released our first game yet.'

To the left is the original sample, and on the right, one created using non-parametric sampling. Just one example of procedural coding (in this case, a procedural texture). Images courtesy of Efros and Leung.
graphics.cs.cmu.edu/people/efros/research/EfrosLeung.html

Procedures of the procedural

Procedural programming has long been staple in the games industry. The most famous title to use the technique is perhaps Ian Bell and David Braben's Elite, which made use of procedural functions to generate an entire universe. All the two developers had to do – after perfecting the code of course – was set up rules and starting values and start the game.

Today, most procedural programming is used to create textures from a few chunks of code, saving the effort of artists. Some procedural techniques, such as non-parametric sampling, can reproduce, at least to a limited degree, the exterior of an image using samples from its interior. As you can imagine, procedural coding used correctly can save a developer a lot of time, as well as allowing for large landscapes and universes that would be impossible to create in a reasonable timeframe by hand.

Developer **Rockstar San Diego**
Publisher **Take 2 Interactive**
Website **www.rockstargames.com**

Players **1-2**
Other platforms **N/A**

VERDICT

Excellent graphics, realism; intense; fast-paced; perfect balance of skill and instinct.

Only good for short bursts; start rewards are bland; might be too simple for some.

SCORE **9.0** OUT OF **10**

She gets real angry when she misses. *Real angry.*

hotaward

Rockstar Games Presents Table Tennis

Rockstar presents... table tennis?
Logan Booker has a paddle.

Rockstar Games Presents Table Tennis was a bit of an oddity for me. Apart from having a name so long anacondas in South America shrivel in its presence, I found it immensely enjoyable. The thing is, I'm pretty darn crap at sports games. From kicking own goals in FIFA to averaging 4000 over par in Everybody's Golf, sports games really hate me. And usually, I hate them too.

Not so for Table Tennis. You might be asking yourself at this point why the heck Rockstar has made a table tennis game when we all know its proficiency lies with games about driving cars around giant sandbox cities with an AK-47 and a ho in the trunk. The answer to this question is that a different Rockstar studio is responsible. If you've ever played Midnight Club or Red Dead Revolver, then you're already familiar with its work. This is good, because Table Tennis isn't about large, sprawling open-endedness – it's about intensity.

Getting into the game is easy – just select a game type, a player and a play area. Hitting the ball is all about on-the-spot decisions, not decoding the control pad. The four main buttons control spin while the thumb sticks manage direction. That's it. Rockstar has taken the Xbox 360 and created a truly next-generation title by removing the main barrier to any game – learning to play it.

Characters are limited to start with, as are play areas, all unlocked in the various game modes. Playing the first few matches of the Tournament mode for example gives you access to new shirts for your players. Admittedly these are hardly inspirational rewards and can be a bit detracting, but perseverance will show you the way to the goodies in due course.

Every character is different, with more than the four stats of spin, accuracy, speed and power determining how they play. Jesper, a big Swede who hits with an arm made for lifting Volvos feels heavy on the controls while Kumi, a fragile agile Japanese girl makes the controller as lithe as she looks.

Speaking of looks – the character models are fantastic. Skin, sweat, facial expressions are modelled with such a degree of accuracy that you'll be trying to wipe the virtual dampness from your brow. The characters will get agitated if they're losing, calling out insults and fidgeting. The crowd is just as dynamic.

Forget Top Spin – once you've played Rockstar's Table Tennis, Top Spin will seem slow by comparison. If you like the idea of the former but found that you were pretty average, pick this game up. With its focus and intensity and reliance on instinct rather than button combos, you might find it more to your liking.

PERIPHERALS FOR THE SERIOUS GAMER

atomic

With the help of Alyx's father, Alyx and Gordon Freeman attempt to figure out where the fun went.

Half-Life 2: Episode 1
Logan Booker pays City 17 another visit.

When you play a Half-Life game, you expect a great story. You also expect to shoot things. It's also mandatory to have gameplay in which most of your time is spent completing puzzles, rather than watching someone complete them for you.

It was quite a shock then when Half-Life 2: Episode 1, the first instalment in what we can only guess will be a series of instalments to Half-Life 2, featured very little of the aforementioned.

Sure, it picks up where the original left off, with Gordon Freeman and lady friend Alyx consumed in a swirly ball of radioactive reactor destruction, but it gets disappointing amazingly fast. Instead of being saved via their own ingenuity or even just cooked by righteous powers of ionisation, a bunch of chanting Vortiguants teleport our heroes to safety, free of charge.

It's the kind of 'deus ex machina' cop-out you'd expect from a $20 game in a bargain bin, not a triple AAA title from one of the *great* developers in the industry. This is the first place where Episode 1 strikes out.

After this little intro, we find out that City 17, the location where most of the game takes place, is falling to pieces with the collapse of the Combine Citadel. It's up to Freeman and Alyx to buy the panicking citizens some time to escape. Thus, they return to the Citadel to contain the out-of-control reactor. Here is where Episode 1 falls down again,

as we get to watch Alyx for about an hour or so do all the hard work. And it's boring.

As the game continues, one would assume cordite-powered weapons – or even a crowbar – would appear. This is sadly not true. If you enjoyed using the Gravity Gun in HL2 to pound baddies with the broad side of a computer console, then the next hour and a half will have you enthralled. If like the rest of us it's more pleasurable to fight with a few hundred rounds of brass, then prepare for a tedium known only previously by salt miners. Laugh as you crouch behind Alyx – who for some reason is almost invincible and dispenses more lead than the entire 101st Airborne did during the Second World War – and look for pieces of debris to fling in desperation at approaching enemies. There's something completely unsatisfying about being mashed to death because a natural disaster failed to leave any gyprock for you to defend yourself with. Alyx even exclaims in seeming confusion when you finally find a gun, as if she expected you to run around like a pansy pulverising enemies with whatever wasn't nailed down for the rest of the episode.

With real weapons in hand it's pretty much the Half-Life 2 we all know. There's a great set piece in the middle, very reminiscent of the underground parking scene in the *Dawn of the Dead* remake, but otherwise the game is lacklustre compared to modern efforts like FEAR.

The Source engine looks schmick, thanks to a revamp including HDR and specular mapping, but there's not much else that makes Episode 1 a compelling purchase. Play it for the same old Half-Life gameplay and the next piece in the puzzle – but not for entertainment.

PC

Developer **Valve**
Publisher **EA/Valve**
Website **www.steampowered.com**

Recommended **2.4GHz CPU, 512MB RAM, 256MB DirectX 9 card; Internet connection for Steam.**

VERDICT

Source engine looks good; classic Half-Life 2 gameplay. ✓

Uninspired, uninvolved and stale gameplay; too much Alyx; throwing rocks; deus ex machina. ✗

SCORE **6.5** OUT OF **10**

Titan Quest

Logan Booker reviews Diablo 3. Oh, wait...

Someone was bound to remake Diablo for this generation's gamers, and it wasn't necessarily going to be Blizzard. This is a good thing, as great games should get a new lease on life when technology can make it more engaging – and let's face it, visually delicious – and developer experience can take an original winning formula and add new concepts to the mix.

It therefore pains us to say that Iron Lore, which set out to do exactly this with Titan Quest, failed miserably. If someone had said to us that an Iron Lore employee snuck into Blizzard, stole the design document for Diablo 2, changed the locale to Greece and renamed it 'Titan Quest', we wouldn't have been at all surprised.

TQ's plot has the gods engaged in a mighty battle with the 'Titans' – the first, true gods that created existence and who have since escaped from their eternal prisons. As you may have guessed, it's up to you to bring order to this celestial chaos as you level, gather better equipment, accessorise and increase your skills.

Character creation is simple – pick your name and gender and away you go. The game proper then allows you to choose up to two 'specialities', which include Nature, Spirit, Offence and Defence, among others. Each level you gain three points to spend in these specialities, as well as a couple of 'character' points to increase your base

statistics of health, energy, strength, intelligence and dexterity.

Sadly, we can't say Titan Quest does anything new at all for the role-playing hack and slash genre. From the very first to the very last minute of the game, you won't once feel like you're playing something original, or even evolutionary.

It's hard not to compare Titan Quest to Diablo, and some might think it unfair to be critical because the game borrows so much. This would be true if TQ had in fact done something – anything – to distinguish itself from Blizzard's title. Unfortunately, the game doesn't so much borrow as it does outright steal core mechanics and even subtle touches (like using Alt to reveal items on the ground, Shift to keep the player stationary while they attack, and fountains and obelisks that grant temporary powers) and this is frankly shameful.

Isolated, Titan Quest is a soild, visually and mythologically rich title, if a little repetitive. Out in the wild however it's nothing more than a developer's attempt to cash in on the RPG fever that Blizzard's World of Warcraft has so effectively spread in recent times. While it would have been easy to forgive the use of genre-standard mechanics, Titan Quest beats itself to death with a giant club for being utterly uninspired. And why have a 3D engine with zoom but no rotate? Seriously.

Developer Iron Lore
Publisher THQ
Website www.titanquestgame.com

Recommended
3GHz CPU; 1GB RAM; 128MB DirectX 9 card; Soundblaster X-Fi

VERDICT

✓ Extremely pretty engine; flexible skill system; modding tools; free town portal!

✗ Blatant rip-off of Diablo that brings absolutely nothing new to the genre.

SCORE **6.0** OUT OF **10**

Rise of Legends:
Rise of Nations

David Field conquers a few city states.

A bit different from the history-based arena of Rise of Nations, Rise of Legends draws its inspiration from magic and technology to create its own fantasy world. Three races are available to play in both campaign and multiplayer, including the Vinci, the Alin and the Cuotl. Each race has its own unique playstyle and mastery of one means nothing when you switch over to another.

In the single player campaigns, each race's back story is explored and explained, and there's plenty to do. All three central campaigns are intertwined and related, in a fashion much like Starcraft or Warcraft 3.

The AI will make life hard if you decide to just go all out on your opponents – expect much anger in the form of little pissed-off tanks and men, especially if you attack opponents before you should. Resource hunting is a tricky business and requires the player to gather two resources: Timonium which is mined, and Wealth, gained through trading and construction of special 'Merchant' districts. There's another resource, Energy, only available and required by the Cuotl that replaces Wealth.

City construction is very organic. Instead of planned plots on a grid, they sprawl out from a centralised hub. You'll return to your cities as you play to expand your empire, research and build units.

Cities also serve as centres for industry, resources and units.

These govern your abilities, trade and army size respectively. Choosing which of these to invest in at the beginning of the game lets you determine the way in which you battle with opposing forces for supremacy, and provides many unique ways of approaching the game. It's amazing how much of an effect investing in a certain area can have on your game and playing style.

Having this sort of control makes Rise of Legends interesting, and provides much of the in-game flow. These are most apparent in the multiplayer section, which is fast, furious and highlights weaknesses and strengths in how you build your forces. Although the sides are supposed to be balanced, we found the Vinci have more powerful units, while the Cuotl are both strong and easy to play. The Alin appear to have gotten the short end of the stick and are both hard to play and have weaker units than the other two.

The detail, scope and options give it an odd feel that resembles a role-playing game in places. Familiarisation and a good memory for what and where you are building are the keys to winning, and as you gain experience, it becomes more enjoyable. This steep learning curve is a bit of a letdown, but for those who have played Rise of Nations or know what to expect from a complex RTS, expect to see Rise of Legends become a firm multiplayer favourite.

Developer **Big Huge Games**
Publisher **Microsoft**
Website **www.riseoflegends.com**

Recommended **2GHz processor;
512MB RAM; DirectX 9 video card
with 128MB RAM; PhysX optional.**

VERDICT

Mix of races and variety; economic model; balanced resource management. ✓

Learning curve steeper than the sides of Mount Everest; hard to track all of your units. ✗

SCORE **8.0** OUT OF **10**

INTERACTIVE

ATOMIC'S GUIDE TO THE COMMUNITY.
READ, WRITE AND CONTRIBUTE!
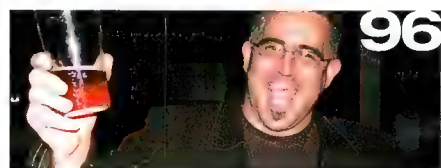
A s I write this, there are catalogs from various DVD companies sitting on my desk. One is open, the page covered with a large image of a blood-spattered scalpel. From the looks of things, it's the box set of a show that's yet to air on SBS, some documentary about dissecting people. Disturbing, to say the least.

What's even more disturbing is the way there's an ad for the box set of *Rocky & Bullwinkle & Friends* staring out from the opposing page.

This is the process Logan and I go through every month, flipping through catalogs of stuff that's going to be released in the coming weeks. We get stuff from elsewhere too – Logan goes to the cinema, I go on Amazon.com benders and we both check out the latest games on DS and PSP. Oh yes, we are cultured.

You might ask why we review movies at all. The answer is simple: they're a part of geek culture. To paraphrase something Logan said on the forums, what's the point of having one of those Dell 24" monitors if you're only going to fiddle with formulas in Excel?

Why on earth would you buy a thumping 5.1 sound system if you're not going to throw in *The Matrix* or *Pirates of the Caribbean* to hear what it can do?

We also review movies because sometimes they're pretty entertaining.

Occasionally, we'll check out handheld games as well because again, they're a part of geek culture. While you may love your PC and Xbox 360 – particularly when they're hooked up to the aforementioned monitor and sound system – the fact remains that sometimes they're not very practical. Like when you're on the train to work, for instance.

Of course, sometimes even I like to get away from technology… so I'll take a break by reading something like Douglas Coupland's *Microserfs*, a funny little novel about a bunch of Mac-loving coders who worked at Microsoft during the early nineties.

Naturally, the forums are abuzz with talk of movies, books and handheld games too. One member in particular – Azazel – seems to watch *everything*. Seriously, the man is a freak. Keep an eye out for his regular movie review threads in the Green Room.

There are also threads for television shows, the most popular of which is easily johnsee's *Lost* discussion, which can be found at **www.atomicmpc.com.au/forums. asp?s=1&c=1&t=55990**.

Be warned though – it's absolutely full to the brim with obsessed fans and monster spoilers.

Atomic – it really is shockingly cultured.

Chris is cultured. We think.
interactive@atomicmpc.com.au

atomic

89

CULTURESHOCK

EVERYTHING YOU NEED TO KNOW ABOUT GEEK FILM, MUSIC AND LITERATURE

CULTURE SHOCK
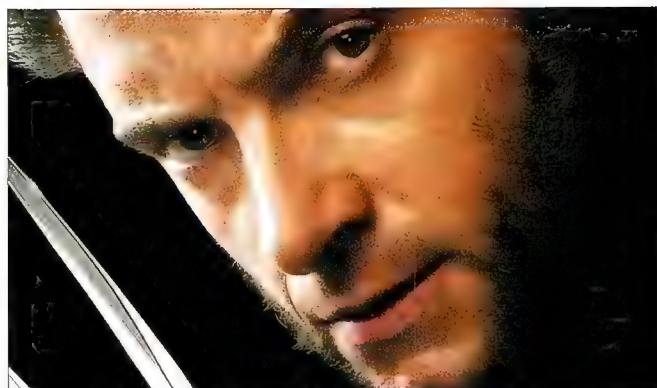
X-Men 3: The Last Stand

CINEMA Starring Hugh Jackman; Halle Berry Director Brett Ratner Distributor 20th Century Fox Website www.x-menthelaststand.com

Although threatened with penalty of death by the girlfriend if the third movie in the X-Men trilogy received a bad review, I had little choice in the matter. *The Last Stand*, despite being packed with enough action to last Rambo until the end of days, fails to satisfy on the character or plot fronts.

X-Men 3 returns to Marvel's quasi-real world of superheroes forged by genetic mutations. You have Wolverine (Hugh Jackman) with regenerative healing and a skeleton made of the almost indestructible metal adamantinum, Storm (Halle Berry) with the ability to control the weather and Xavier (the infallible but sadly wasted Patrick Stewart), leader of the goodly band of mutants and wielder of great psychic powers.

The story revolves around a newly discovered 'cure' for mutations that can permanently suppress the resultant abilities. Its use sparks heated debated, with a very big and blue Kelsey Grammer as the Beast representing the views of the mutants. While some are grateful that they finally have a choice, others see it as an affront to natural evolution – the most outspoken being Magneto (Ian McKellen). Interweaved with this main story is the return of Jean Grey – but she's not completely right in the head.

With Brian Singer, director of the great *X-Men 2* busy with the new Superman flick, it was left in the not-so-capable hands of Brett Ratner, who was responsible for *Rush Hour*. The movie leans heavily on Ratner's action-centric style and forgoes depth and character development in the quest for bigger explosions and glossy scenes. Many of the fantastic actors recruited for the film, such as Stewart, have a vaporous presence thanks to an average script.

While a capable film that fans will enjoy for the special effects, *X-Men 3* lacks the rich use of actors and their characters found in previous instalments and touches only briefly on the strongest aspects of the series. **LB**

score **7.0** OUT OF **10**
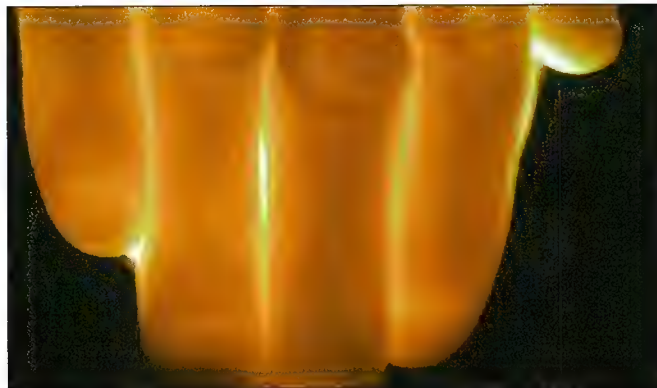
Dermaphoria

BOOK Author Craig Clevenger Publisher HarperCollins Publishers Website www.craigclevenger.com

We're huge fans of Craig Clevenger's first novel, *The Contortionist's Handbook*. It has everything – crime, forgery, intentional drug overdoses, psychology and a narrator who sported eleven fingers, all wrapped up in a decent little story. It was just plain cool.

Dermaphoria is the long-awaited follow-up. The story centres on Eric Ashworth, who has just woken in a Las Vegas police cell after an overdose. The police think he's linked to a fire that destroyed a drug lab in the desert, but Eric can't remember a thing and is eventually released on bail. Our hero soon comes into contact with Derma – a flashy designer drug that synthesises the sense of touch and helps him remember.

Despite the dark premise, this is a fun read. Poor Eric is probably the most paranoid fictional character we've ever come across. In one scene, he causes a bit of a commotion in a diner when he suspects the moose head on the wall is monitoring his movements and reporting back to the authorities.

Clevenger makes it clear that Eric is suffering from a pretty serious condition, but it's also incredibly funny if you're the sort of person who appreciates the humour in titles like *Trainspotting* and *Fight Club*.

The insanely paranoid narrator, dark humour and wonderfully poetic prose make this an essential read for everyone tired of the homogeneity served up by the likes of Matthew Reilly, Dan Brown and co. **CT**

score **8.0** OUT OF **10**

CRITICSCORNER

CINEMA **Click**
Starring: Adam Sandler; Kate Beckinsale
Michael Newman (Sandler) is in desperate need of a universal remote to make his life easier. What he ends up with is a device with the power to traverse his life like a DVD. *Click* is typical Sandler fare – sight gags, hot leading ladies and Rob Schneider. Predictable end but enjoyable enough.

DVD **GOAL!**
Starring: Kuno Becker; Alessandro Nivola
Have you got a 'World Cup' hangover? We have the cure for you. *GOAL!* is about Santiago (Becker), a young teenager dreaming of becoming a football star. A former scout discovers the young player and encourages him to go to England to pursue his dream. Standard sport-inspired film but if you love football, it's a must see!

TV **My Name is Earl**
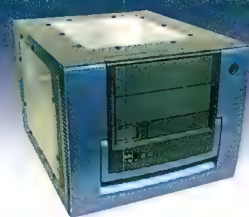*Starring: Jason Lee; Ethan Suplee Channel 7, Thursday 8pm*
The story is about Earl Hickey (Lee) who runs into some bad luck (he gets hit by a car shortly after winning the lottery) and believes karma is out to get him. So he creates a list of all the bad things he has done and makes up for his bad deeds. One of the best comedies since *Seinfeld*.

classifieds

INPUTOUTPUT

Tech of the Dead

Well, not if you have **Daniel Rutter** hanging around to address all those tech troubles. Talk with him at **io@atomicmpc.com.au.**

I/O OF THE MONTH

And a cow-catcher on the front

I've been toying with the idea of using a low boiling point liquid in a watercooling system. I then noticed how a power plant works by boiling water, creating pressurised steam (vapour), which then drives turbines to generate electricity.

So, what if the water in a watercooling rig was replaced with a heatpipe fluid that boiled into a pressurised vapour at around 20°C to 30°C, and could be used to drive a mini turbine, and generate electricity?

Of course, you would need a special CPU water block and radiator (condenser or heat exchanger) for it to work, but if the system had an efficiency of 25 percent (typical of steam engines with a condenser), it could output around 20W of power when used with an 80W CPU. That could easily run a few extra fans, and keep the system cooler.

Do you think that this could be possible and/or practical?

Gabriel Haines

Steam engines are heat engines, and the efficiency of heat engines depends on the temperature difference between the hot end and the cold end. A closed turbine of the kind you're describing uses the Rankine cycle (**www.wikipedia.org/wiki/Rankine_cycle**), and can indeed achieve quite impressive efficiency. But to do that it needs high pressure, superheated steam – water vapour heated up as hot as the designers can possibly make it. An unremarkable steam locomotive could be running on 200°C steam at 15 atmosphere pressure, and the big turbines run much, much hotter. A bigger temperature differential means better efficiency, for all heat engines, so you want to ramp them suckers up until boiler rivets start pinging off the walls.

If you're running a heat engine with the cold end at room temperature and the hot end only as hot as a CPU can make it – say, 80°C – its efficiency will be miserable. Assuming your masterful mini-lathe skills leave you with the world's first 100 percent efficient turbine and pump (you need the pump to return the condensate in the low pressure condenser to the high pressure boiler), you may be visiting the lofty heights of, oh, 0.95 percent efficiency.

In other words, I'm afraid your turbine in the real world won't make enough power to run the pump that feeds its boiler, much less turn a generator.
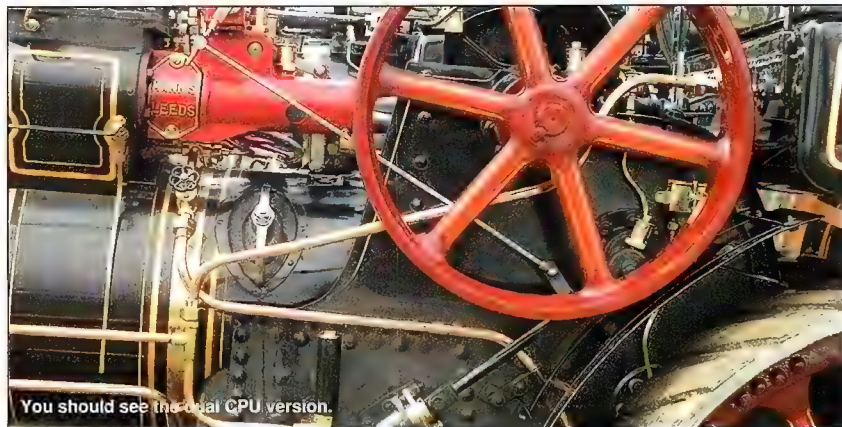
You should see the dual CPU version.

Step one: Hate your customers

Can you please tell me how you can make copy protection on a CD/DVD?

As far as I know, when you or I write data to a CD or DVD the data gets stored as dips and bumps. If this is correct, then how can you possible protect that? I mean, all you would have to do is create a program that can read the dips and bumps exactly as it is on the disc, and you should be able to replicate anything!

Obviously I am missing something. If everything is just 1s and 0s then it should be simple to copy anything.

Sean D

It's not dips and bumps – just dye and no-dye, for writeable media as opposed to stamped discs.

But the important part here is that there's more data on the disc than just the data the user wants to write there. There's various framing, table-of-contents and error-correction data, for instance, and people creating copy-protection schemes can screw with all of it.

Deliberate errors, files that appear to be much bigger than the disc, weird abuses of the Red Book audio format for real audio tracks or tiny pseudo-tracks; all kinds of stuff that, technically, mean the disc in question no longer qualifies as a CD or DVD, as it's deliberately out of spec.

Back in the floppy disk days, game companies did conceptually similar things, which could often be defeated by using a block copying program that did exactly what you'd like to do – read the raw data from the disk at the lowest possible level, and then write that same data to the other disk, without trying to
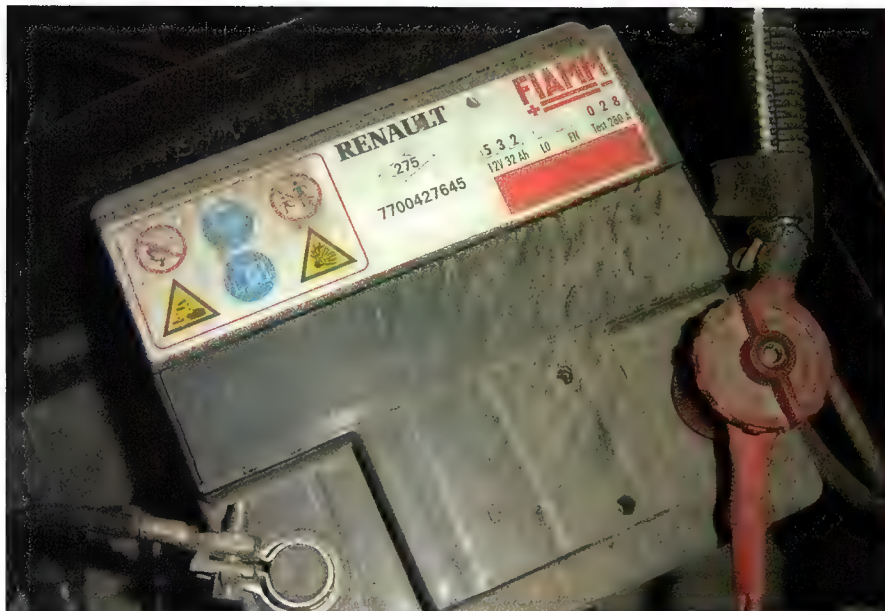
▲ **A key part of any homemade UPS. Just make sure there isn't a car attached.**

figure out whether it made any sense.

Unfortunately, the panoply of CD and DVD formats out there, and the very nature of the 'fuzzy' encoding of data on the physical discs themselves, makes it impossible to bit-copy optical discs.

More info **www.cdrfaq.org/faq03.html#S3-42**.

More DIY UPS fun

I read with interest your old piece about the DIY ghetto UPS.

Do you know how long a typical deep cycle marine battery would power a computer through an invertor?

Tom

How long is a piece of string? Deep cycle batteries come in a variety of capacities and voltages. Even if you stick with 12V batteries, mainstream dealers commonly stock batteries ranging from less than 100 to more than 200 amp-hours (Ah), and the same places will also have batteries not specifically made for the marine market that range from only a few amp-hours (starter batteries for small motorcycles) way up into the hundreds.

A modern low power PC (you can get desktop Core Duo/Solo motherboards and CPUs, now – they're the same low-power, high-performance deal as the older desktop Pentium M machines) with an LCD monitor could be expected to only draw around eight amps, total, from a 12V battery through an invertor – less when doing nothing, more when working hard. So you could be pretty confident about getting three hours of run time from a tiddly 25Ah battery.

These kinds of batteries are commonly specified with a '20 hour' capacity figure – how much capacity you get if you only load them hard enough to flatten them over 20 hours. The heavier the load, the lower the real capacity you get will be. Even a mere 20kg '80Ah'

marine battery though, should deliver most of that capacity into an 8A load – it's only around twice its 20 hour load, not some huge bank-of-spotlights kind of figure. So eight hours of 8A run time shouldn't be a problem.

Note that even 'deep cycle' batteries don't actually *enjoy* being run flat. As many an irritated motorist knows, if you run a lead acid battery flat it'll suffer damage, thanks to a process known as 'sulfation'. But 'desulfator' gadgets are now becoming more commonly available – and, surprisingly enough seem to work – and there are also electrolyte additives that reduce the sulfation problem, so there's something to be said for using cheap car batteries instead of fancy sulfation-resistant deep cycle models.

I'd still put the dirty things in a plastic tray full of sodium bicarbonate if I was using them indoors, though.

Minimum recommended desk height: 700mm

The PC version of Oblivion says '2GHz processor required, or equivalent'.

I've got an Intel Centrino with Core Solo Processor T1300, Intel 945GM Express chipset,

Ten points to the first person who gets Oblivion running on a Voodoo Banshee.

1GB of RAM, 667MHz system bus. It's only 1.66GHz – would that be 'equivalent'?

John

That CPU is quite fast enough. The Core Solo/Duo CPUs are the successor to the Pentium M, and they get a lot of work done per clock tick.

Intel is currently suffering from Processor Numbering Disease, where every chip has a number attached to it that tells you something about how fast it is compared with other chips in the same line, but which tells you nothing about how fast it is in general. Historically, processor manufacturers do this when they have good chips that run at relatively low clock speeds, then stop doing it when they have fast-clocked ones again.

I'm presuming you're talking about a laptop here, though (it's possible to run Core chips in desktop machines now, but not many people are doing it), and so the 945GM is all you have for graphics, and all you'll ever have in that PC.

This means you are screwed, because Intel's integrated graphics adaptors are always slow as a wet week for 3D, and Oblivion is a big graphics card hog.

Intel's strategy for improving the 3D performance of its integrated graphics adaptors has, traditionally, been to give them exciting names that suggest great speed. The chips themselves remain simple low-power cheap units for the business and non-gamer home markets. The 945GM's graphics component is called the Graphics Media Accelerator 950, and it's the fastest Intel integrated adaptor ever, which puts it only a *bit* below the minimum specification for Oblivion.

This means you could probably get Oblivion running on your computer, with all of the graphics sliders wound all the way down and all of the boxes unchecked, and *possibly* play an enjoyable game. I wouldn't get my hopes up, though. Minimum specifications are usually pretty darn optimistic, because the game makers know that minimum specs sell the game, and then people who actually have that minimum hardware try to play the game, and then buy better hardware. If you have a laptop that can't be upgraded, it's best not to taunt yourself with overly demanding software.
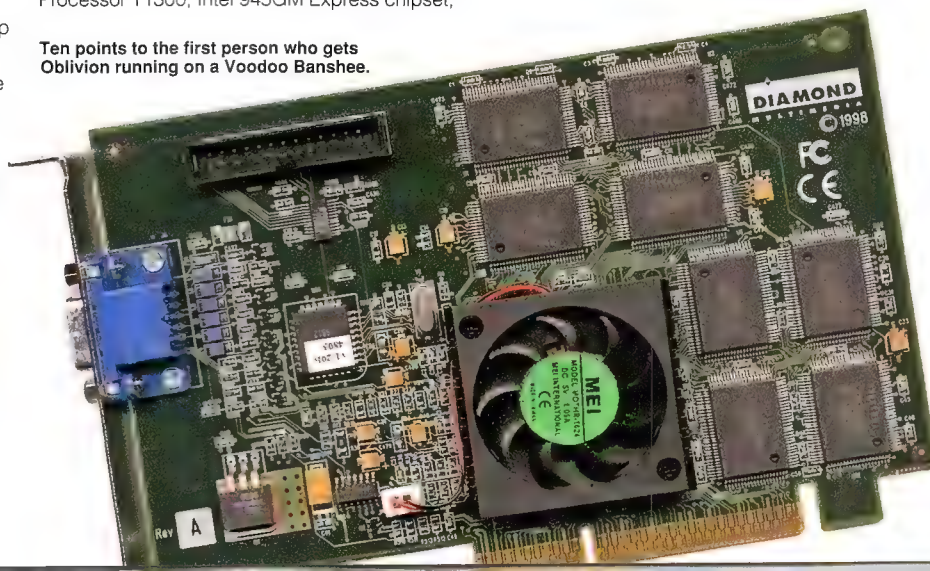
COMPETITIONS

Win, Forrest, win!

To enter, go to www.atomicmpc.com.au/competitions. You can only enter once per competition or you'll be disqualified. You must provide a postal address and phone number for prize delivery when you enter (not a PO Box).

1x Limited edition custom Atomic & Prey spray-painted performance gaming PC + 10x Prey mousepads

Waiting for that awesome-looking first person shooter called Prey? With a great story involving native Americans and hostile aliens, frenetic multiplayer and upside-down running, how could you not be seized in anticipation? To celebrate the soon-to-be-released game, Take 2 (www. take2interactive.com.au) has a beefy gaming PC to give away that we'll be spraying with a combination of *Atomic* and Prey-related imagery! Enter now and don't miss out. As a bonus, ten lucky runners-up will receive a Prey mousepad!

Visit **www.atomicmpc.com.au/preycomp.asp** for all the details on how to enter! Terms and conditions apply.

6x copies of GTR2 and 1x Logitech MOMO Racing Force steering wheel

We already know how utterly great the original GTR was. Forget Gran Turismo – you might as well be driving a cardboard box around a track. Not so with this little gem from German outfit SinBin, it's the place where diehard racing fans go for a realistic and gruelling racing experience.

That's why we're all excited that the sequel is here. It's better, faster and generally more fantastic than the first game and Ben can't stop talking about it.

So you can have the opportunity to play this great driving sim, we have 6 copies of the game to give away and, to one of these lucky winners, a Logitech MOMO Racing Force steering worth $199.95. It's the best racing wheel we've seen in a while and with a one-year warranty you can't go wrong!

All this is thanks to Atari (www.atari.com.au) and Logitech (www.logitech.com). Cheers guys!

Q In what year did Formula One driver Ayrton Senna leave McLaren for Williams-Renault?

To enter visit **www.atomicmpc.com.au/competitions**. The closing date for entries is 9 August 2006 Winners will be announced in *Atomic 69*

Atomic 65 winners 5x copies of Tomb Raider: Legend for PC Q. Which developer took over from Core Design for Tomb Raider: Legend? A: Crystal Dynamics. A. Mason, Glenelg South SA; D. Bolland, Darwin NT; J. Robertson, Gordon ACT; L. Leong, Bulleen VIC; T. Herrero, Brisbane QLD   3x Western Digital WD5000KS 500GB drives Q: How many bytes are there in a 'gibibyte'? A: 1,073,741,824 J O'Keeffe, Hawthorn VIC; M. Lip, Quakers Hill NSW; A. Tansell, Brunswick NSW

ARTOMIC

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Adobe Photoshop CS2

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AVATAR
**ATOMICANS!
TELL US WHO
YOU ARE**

AVATAR

seehund

Christopher Taylor catches up with seehund to
sail the seven seas and put his mind at ease.

Navy man or Iron Chef? Clothed or naked? These are just two of many questions we sought answers for from seehund, a multi-talented forum regular with a great love of food, beer and tiny beards.

atomic So how did you come across *Atomic*?
seehund I was waiting for a connecting flight to Brisbane a few years back and had nothing to read, so I did what most people do and started browsing the airport bookstores. I'd been trying to find something from a magazine that was slightly off-centre from all the sanitised, run-of-the-mill magazines out there and the last place I expected to find it was in an airport.

atomic We hear you worked for the Navy. What did you do exactly?
seehund I worked as a communications technician. When I joined I thought it would just be repairing radios, but boy was I wrong. I got to work with satellite, cryptographic, multiplexing and networking gear to name just a few things, as well as radios. I also had to work within the engineering department at sea which meant helping with engine and generator maintenance as well as radar and surveillance gear. The job has a lot of hidden details that you don't get to discover until you get out there.

atomic What's the most interesting bit of tech you've seen on the job that you can talk about?
seehund We once trialled a bit of equipment that replaced the equivalent of two transceivers, and one satellite multiplexer complete with the most comprehensive self-test unit we'd ever seen and all remote via laptop. The whole unit took up as much space as one of the transceivers it replaced. To give you some sense of scale, the transceivers were about as big as an old convection microwave

oven. And the satellite mux was bigger again. This might not excite the average person on the street, but when you're talking about taking up less space and weight at sea, as well as better integration and increased reliability, well, it was very exciting for us.

atomic What's the Iron Chef *Atomic* competition about?
seehund Charcoal [another *Atomic* forum user] came up with it. It's all about trying to foster a sense of comradeship and creativity in the forums again. I mean, what better way to get people together than with food? I think it has already taken off with some very healthy competition and the results from the first round speak for themselves. Charcoal's eggplant dessert was simply inspired. It also shows people what you can do with simple ingredients and a bit of imagination. Students take note – there's a lot you can do with what you've got hanging out in the dark corners of your pantry.

atomic Why do you think it's been such a success and why do you think that cooking threads are so popular on the forums?
seehund I think it's been successful because we have a lot of very creative people in the forums. I think kurva's *Atomic* Cookbook highlighted that. Cooking is something everyone can enjoy and I still see cooking threads pop up occasionally, but nothing really on the scale of the Cookbook. Also, Iron Chef seems to be a bit of a cult favourite among geeks, so what better way to promote a cooking thread? I don't know why so many Atomicans are into cooking. Maybe we're all just closet chefs at heart?

atomic Have you ever been a chef?
seehund No, but it was the third choice on my enlistment application.

atomic You're also interested in photography. What sort of camera do you have?
seehund I have my old Canon AE-1 with a 70-210mm manual lens, a 52mm fixed and I recently upgraded to a Panasonic DMC-FZ30 – eight megapixels of photographic goodness. I still use the old Canon though because I love the solid manual feel of it. Plus I think there's a warmth and soul to 35mm that digital just can't reproduce.

atomic What sort of photography do you do?
seehund Mainly sunsets and sunrises. I can never get tired of them. I used to do a lot of seascapes, but that's a little bit difficult to do these days – I have to pay to get out there now. I've done a couple of weddings but I've found I don't really enjoy photographing people. At the moment I'm doing a theme on urban street and poster art.

> **There was a club that ran an amateur strip competition with a $100 bar tab prize; this was a no brainer for a sailor.**

atomic On the forums you've said that you were naked on stage once. What's the story there?
seehund Ah, I knew this would come up. There was a club in Cairns that used to run an amateur strip competition with a $100 bar tab as the first prize; this was a no-brainer for a sailor. So I'd get up and disrobe for the public and win the odd bar tab. Plus it was a great way to meet girls; if they talked to you later, well, then you were home and hosed.

atomic And you've shared a stage with someone famous?
seehund Tania Zaetta and Miss Nude Australia 1998. I placed second in a competition during a 'deviants and strippers ball' if I remember correctly. Hey, it was a cold night! 'Nuff said there I think.

atomic Sure. Just keep telling yourself that!

WEBSIGHT

A HANDS-ON LOOK INTO THE AWESOME ATOMIC COMMUNITY

atomican

www.atomicmpc.com.au

PC GAMING	XP XXX		6	81		14/10/05 1:07:25 PM by mpn64
CONSOLE GAMING	[BUMPED!] [BUMPED!] Computer Tech Tips.............................[1 2 3 ...17]		6	70	vk2amv	14/10/05 12:59:59 PM by vp747
TECH REVIEWS	Recommend UPS for MISSION CRITICAL Usage		23		Waltish	14/10/05 12:42:28 PM by Waltis

Moz Aussie, Aussie, Aussie! Oi, oi, oi!

Hulkster Um, mate… The Commonwealth Games have been over for months.

Moz Where have you been old man? Counting your grey hairs? Having your false teeth glued back in after that unfortunate episode with the toilet seat? The soccer World Cup is on and Atomicans of all races and creeds are lapping it up! Have a read. You might learn something.

www.atomicmpc.com.au/forums. asp?s=1&c=1&t=87126

Hulkster I didn't realize that we had so many soccer fans on the forums. Pfft. I bet they can't play though.

Moz Not all Atomicans are a bunch of fat, lazy good for nothings like you. Cast your eyes here. Led by the fearless staffer Ben Mansill, the good cyclists of Atomic attacked the trails around Manly Dam with a passion. Been a while since you had a ride hasn't it?

www.atomicmpc.com.au/forums. asp?s=1&c=5&t=1524

Hulkster At least I can remember what the real thing is like. You still need to download 'data' to help you.

Moz The Internet is for porn. Everyone knows that. But when they are finished on the Net, Atomicans like to get out and have fun! Like paintball! Who doesn't love that?

www.atomicmpc.com.au/forums. asp?s=1&c=5&t=1504

Hulkster I don't get it – Atomicans with paintball guns seems a bit like you with a girl. No idea what to do or where to aim.

Moz You're stuck thinking about sex again. Here, I'll get your mind off it. seehund, like so many others on the forums, loves a good impromptu feed. Inspired by the Iron Chef show and a fridge full of unrelated foods, he created the Atomic Iron Chef challenges! There were three in total

and they attracted some of the best self-proclaimed chefs that Atomic has to offer. What a spectacle!

www.atomicmpc.com.au/forums. asp?s=1&c=1&t=87158

Hulkster Have you found my glasses?!

Moz *Sigh* Moving right along, mahalos wanted to know what we all did for a crust. If you've ever wondered what sort of diverse background geeks come from, then this is a good place to start.

http://www.atomicmpc.com.au/forums. asp?s=1&c=1&t=87816

Hulkster I see your occupation was listed as 'Bum'. Stepping up in the world, huh?

Moz Seems everyone is on my case this month. Did you see what Sap and Lambo did to my macho but highly sensitive image? The latest instalment of the popular show The Atomicans was released to an eager fan base. And it starred me.

www.atomicmpc.com.au/forums. asp?s=1&c=1&t=87191

Hulkster Ha, ha! It's a classic! Belongs here with all the other pearls that the Atomic sea bed has nurtured into beauty.

www.atomicmpc.com.au/forums. asp?s=1&c=24

Moz Ah, the classic threads… What a list! There's enough reading for a month right there. So, when you're done with the magazine, get yourselves online and join the Atomic community. It's fun for all the family – even the dog!

Sydney Atomicans enjoy a moment of quiet in the sun before the annual pain-fest.

POST OF THE MONTH

Warming up the cold winter weeks are words of wonder all over Atomic. Words what make us larf, cry, barf and fly. Rhyming words, most better than mine. Many worse.

If you hadn't guessed, we're paying dues to POTM, which rhymes with

'bottom'. That's hot.

We were won over at the last leg by a short snappy winner from Cummings, commenting on the review we posted for The Da Vinci Code. It had us larfing so hard it hurt, in that good way.

www.atomicmpc.com.au/forums. asp?s=3&c=12&t=11309&p=3

Mouse it up, Cummings! You have a sexy Logitech G5 pointer cumming your way, you lucky lad.

FALLOUT

The end is Wi-Fi: Part 2

Logan Booker continues the tale of woe and wireless…

For the next few moments the pair stared at one another. Not even a pile of dead computer science students in a library could match the unnerving silence between them.

Then Wil spoke.

'Give it a kick. Or a tap.'

Dee didn't hear the suggestion. Not that it was the most impressive of suggestions, more like one of those highly inappropriate comments you hear from time to time during after-dinner conversations that everyone politely ignores.

'Used to work for my microwave. The kicking that is.'

'Don't say microwave. Just don't. Give me a hand. Right now.' Dee started to dig with her hands around the base of the jammer. Chances were the light was just faulty and the device was still active.

Still protecting them. If it wasn't, well, it was enough to make Dee soil a perfectly good pair of combat dungarees.

Wil hadn't moved. He was standing beside her staring at the sky like he was expecting God himself to strike him down with a lightning bolt.

'Do you think it might rain tonight?' he asked. His eyes remained fixed on the cloudless horizon. 'I haven't, um, seen rain for a while. It calms me right down.'

That was when Dee lost it.

'Let me make this clear. I don't care about you, I don't care about the sky and I certainly couldn't care less if it rained or not.' She took a ragged breath and glared at him.

'Now shut up and dig you fool… unless you *want* to be roasted alive. Don't know about you, but I'm happy as I am, thanks.' She continued to attack the small hole she'd made by the jammer.

Wil somehow appeared more surprised by her outburst than the news of his impending death; there was nowhere else for his eyebrows to go but down, having climbed to the top of his head already.

At that moment it finally clicked in his mind that the danger of being cooked by a wireless beam was very real. Like an old 1950s light bulb wrought of metals so hazardous they made nuclear reactors look like do-it-yourself chemistry sets, Wil switched on and fell to his knees beside her.

'I can't say I like the idea of becoming a chicken.'

'What the hell are you talking about?'

Wil sighed. 'Roasted. Like a chicken. They still roast chickens around here don't they?'

Dee ignored him.

A minute's worth of combined scraping, poking and gouging revealed the maintenance panel for the jammer. Dee shoved her hands into her pockets and fumbled desperately for the key.

'What now?' Wil looked confused.

'They keep the panels on these things locked. Don't know why. It's not like someone's going to just turn it off,' Dee coughed in the now-dusty air. 'Pain in the arse if you ask me, but still, you know, they still do it.'

'Like they still roast chicken?'

It took willpower beyond the capabilities of even He-Man to stop Dee from knocking him unconscious.

The key eventually found its way into her fingers and she wasted no time inserting it into the lock of the panel. The spring-loaded hinge popped and smoothly slid open.

What she saw made her die inside.

The circuitry was covered in a brown sludge that smelled like fried ozone. It stung her eyes and burnt her nose. Dee could only surmise that a component had blown and killed the redundancy electronics.

'Looks like molasses.' Wil chirped.

'Smells like death.' Dee slammed the panel closed and did the only thing she could.

She ran.

> ## "The hinge popped open. What she saw made her die inside."

Wil tripped backward as she leapt from her crouch. Dee grabbed rock, dirt and shrub in an attempt to gain balance, grazing her palms in the process. Running had never been so hard.

'Go, get out of here – go back to the bunker,' she yelled behind her. A noise like a parakeet being suffocated by a pillow erupted at her back and a screaming Wil, aluminium hat and crazy hair in tow, raced past her at a few kilometres per hour slower than the speed of sound.

Dee swore she could hear the deadly, mind-frying hum through her makeshift foil protection, the intensity increasing with every passing second. She started to cry, choking on muddy tears as she ran.

They were as good as dead.

Are aluminium hats enough, or will our heroes be fried, Kentucky-style? Read on next month for the thrilling conclusion to the Dee and Wil saga!

MISSED OUT ON THE FIRST AMAZING INSTALMENT? CHECK OUT *ATOMIC* ISSUE 66!